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The Psychology of Firesetting: A Review and Appraisal

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A REVIEW AND APPRAISAL

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PREFACE

This report is the product of the first year of a two-year project sponsored by the Center for Fire Research (Grant Number G7-9021), designed to place what is known about arson and firesetting within the context of current knowledge of personality and behavior. The objective of this paper is to review the literature on firesetting and to formulate a preliminary conceptual basis for classifying firesetting and for understanding its determinants. Future work will be geared toward refining this conceptualization and applying a detailed analysis of the contributions of various theories of behavior in explaining firesetting. Ultimately, the results of this project should be useful in suggesting directions for future research as well as in serving as a resource for those involved in the prevention and treatment of firesetting.

The authors wish to express their appreciation to Dr. E. Earl Baughman of the Department of Psychology, University of North Carolina at Chapel Hill, who has acted as a consultant to the project and has provided many insightful suggestions and comments throughout the preparation of this manuscript. Dr. Bernard Levin of the Center for Fire Research has guided this project since its inception; his contributions of information and helpful suggestions are gratefully acknowledged. Mrs. William Eichman has worked diligently and accurately in typing the final draft, as well as earlier drafts of this paper.

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ABSTRACT

Despite a rather large and diverse literature on firesetting, relatively little is understood about its determinants. This situation exists partly because of the enormous difficulties in carrying out systematic, well-controlled research studies on firesetting. Legal difficulties in accessing samples of arsonists, the manner of legal disposition of arson cases, and the fact that relatively few arsonists are apprehended makes it likely that research samples will be narrow and biased; it is not surprising that conclusions have often been contradictory and comparisons between groups have been extremely difficult. Little is known, for example, about arson-for-profit and how people who set fires for profit compare with other types of firesetters. A further problem is that previous attempts at classification of firesetters have usually been based arbitrarily upon one aspect of the act, such as the firesetting motive, while other, potentially more important, distinguishing features may have been overlooked. Despite these problems, there is a great deal of rich clinical data in the literature, and some recent studies, especially of youthful firesetters, have opened up promising areas for future research. After reviewing previous attempts at classifying fire-setters, the present study organizes current knowledge about the characteristics of firesetters into four major categories: antecedent environmental conditions, organismic variables, actual firesetting behavior, and the consequences of firesetting. Understanding a firesetter's behavior requires an assessment of each of these categories, and types of firesetters may eventually be defined by clusters or patterns of characteristics rather than by a single, overriding feature. This approach is also useful in that it has theoretical implications as well as implications for prevention and treatment strategies.

INTRODUCTION

Arson and firesetting have caused increasingly serious economic, social, and health problems in the United States. Data provided by Teague (1978) illustrate the rapid increase in arson in this country. In 1964 there were 30,900 fires of confirmed or suspected incendiary origin, causing $60 million in direct losses. By 1974 the figures had grown to 114,000 fires and $550 million in direct losses. In 1975 there were 144,000 fires of confirmed or suspected incendiary origin (an increase of 26% over 1974 figures) causing $633 million in direct losses. These figures do not include the large proportion of fires (36% in 1975) classified as due to "unknown causes" (National Fire Protection Association, 1976). Assuming that some fires in the "unknown causes" category were in fact of incendiary origin, the direct costs of arson are even higher. Furthermore, the total economic costs (direct plus indirect) of fires due to arson, while difficult to estimate, are higher still, and would include losses due to unemployment, reduced tax bases, fire fighting systems costs, insurance systems costs, court costs, and health care costs. The social and health effects of incendiary fires are best estimated in terms of human disruption and misery. Clearly, firesetting represents a problem of major importance, and a study of every aspect of the problem is warranted.

The purpose of this report is to examine what is currently known about the psychological factors involved in firesetting. According to Lewis and Yarnell (1951) at least 130 articles on the subject appeared prior to 1890. With such an early start in research, it is perhaps more than a little surprising that we still know comparatively little about the etiology of firesetting and even less about its treatment (Moretz, 1977). This report will go beyond simply summarizing existing descriptions of firesetters. We will attempt to evaluate what is known and place this knowledge into a generally useful frame of reference. Hopefully the framework proposed will suggest additional research as well as providing an understanding of firesetting in terms of antecedent factors that contribute to the firesetting act and the consequences of the fire that affect similar acts in the future.

The literature on firesetting contains a paucity of systematic, well controlled studies which present reliable data. Instead, most studies have been rather conjectural, based on the authors' experiences with firesetters over a number of years, and presenting case examples with incomplete data. Some of the factors contributing to this unfortunate state of affairs may be out of researchers' control. Because arson is a crime, arson research often interfaces with, and is subservient to, the legal process. Because of questions of legal rights of the accused, researchers may not be permitted access to their subjects until after disposition of cases. Intervening time which a subject has spent in a jail, prison, or psychiatric facility may adversely affect the validity of psychological test data, observational material, and the reconstruction by the arsonist and others who know him of events leading up to the arson act. Forensic psychiatric data, while not suffering as badly from these difficulties, may serve legal purposes to the detriment of scientific purposes. Lawyers for the prosecution and defense both have an interest in securing psychiatric and psychological evaluations favorable to their cases, and there are legitimate differences of opinion among professionals.

In addition to the above research problems, factors such as age, social status, psychiatric diagnosis, and the nature of the offense may all influence the disposition of criminal cases. Many cases do not pass through the legal system at all, but come to the attention of therapists and researchers working

in clinics. Thus, the data on firesetting come from a variety of sources, and it is difficult to determine the generality of findings. There are studies on firesetting in children (Kanner, 1957; Yarnell, 1940), adolescents (Lewis & Yarnell, 1951; Macht & Mack, 1968; Yarnell, 1940), adults (Inciardi, 1970; Lewis & Yarnell, 1951), females (Lewis & Yarnell, 1951; Tennent, McQuaid, Loughnane, & Hands, 1971), prisoners (Inciardi, 1970; Wolford, 1972), and hospitalized patients (McKerracher & Dacre, 1966).

With studies often dealing with a narrow sample and incomplete data, it is not surprising that conclusions have often been contradictory and comparisons between groups have been extremely difficult. Writers have too often paid scant attention to methodological details and have ignored large portions of the literature. Despite these problems, the literature contains an enormous amount of rich clinical data, and some important conclusions about firesetting behavior can be drawn. Moreover, an extensive review provides an opportunity for researchers and clinicians to come into contact with a literature which is otherwise scattered among diverse journals and publications which are often difficult to access. The present review covers the literature roughly from 1925 to the present, with emphasis on more recent literature. These are the paper by Yarnell (1940) on firesetting in children, and the extensive monograph by Lewis and Yarnell (1951) which concentrated mainly on firesetting in adults.

Throughout this report, the terms "arson" and "firesetting" will be used somewhat interchangeably. Actually, "arson" is a legal term while "firesetting" denotes the actual behavior of setting fires under inappropriate circumstances, irrespective of legal status.

CLASSIFICATION OF FIRESETTERS

Classification systems both reflect and shape the distinctions which researchers make within their field of study. While most writers on the psychology of firesetting have operated under at least some implicitly stated classification system, classificiation as a subject of study has received very little attention. Consequently, categories of firesetters are often arbitrarily defined, and there is often a great deal of inconsistency in classification. Firesetters have probably most often been typed in terms of their motive for the firesetting act (insurance fraud, revenge, jealousy, etc.). In other cases, classification is likely to be according to some overriding characteristic of the sample being studied: children, adolescents, females, psychotics, and prisoners, for example. In the few studies which have attempted more or less formal classification systems, some combination of these methods has been employed. An examination of some classification strategies will help to clarify distinctions between types of firesetters, point out some difficulties in these strategies, and suggest some strategies that might be more fruitful.

Levin (1976) identified three major groups of firesetters: (a) arson-for-profit, (b) solitary firesetters, and (c) group firesetters. The latter two categories exclude cases of arson-for-profit. These three categories may be broken down into more specific types.

Arson-for-Profit

This category includes those who set fires for material gain, and probably represents the most rapidly increasing group of arsonists. People who set these fires include the following examples: the businessman who sets fire to

his own business to collect insurance or who hires a paid arsonist for that purpose; the "torch" or paid arsonist who sets fires for a fee; the affluent housewife who sets a smoky fire to collect money for redecorating; and the welfare recipient who sets fire to his apartment to collect relocation expenses. Levin (1976) also included within this category firesetting to destroy evidence of other criminal activity. On the other hand, Inciardi (1970) placed firesetters who use arson to cover up another crime in a separate category from fraud arsonists.

There is currently a scarcity of reliable data on the relative incidence of arson-for-profit or on the types of structures or businesses which are at high risk. It is generally agreed, however, that the risk of fraud arson is especially high where changing economic conditions have created an over-insurance situation. For example, changing market conditions may reduce the value of certain business inventories, so that the owner of a business may be able to collect more from a fire insurance claim than could be obtained if the inventory items were sold on the open market. The owner of a business may not have the money to make needed repairs, and a fire represents a ready source of income. The possibilities for motives are as varied as the economic conditions which make it possible to realize gains and minimize losses from a fire, and arson investigators are in fact very aware of the relationship between economic variables and arson-for-profit.

It has been suggested that for certain types of entrepreneurs arson may be treated as a part of normal business activities, with no greater perceived risks associated with it than with many other business activities. Furthermore, in many cases arson may not merely represent an alternative which a businessman employs in order to extricate himself from a difficult economic situation, but may actually be the major business activity. Recently, two television networks[1] documented the manner in which inner-city apartment buildings are purchased in order to be burned for profit since the decaying buildings could be purchased for a price considerably below their insured value. Rice (1956) described five different criminal business conspiracies, including arson. Each was operated by a bonafide businessman functioning within the spirit of free enterprise and supported by the complicity of so-called "honest" men.

Within the business community, the low risks involved may result in many people actually treating arson as though it were somehow legitimate. This view is supported by data showing that the conviction rate for all types of confirmed or suspected arson is considerably lower than for other types of crimes (Moll, 1974; Rottenberg, 1976). It can be reasonably argued that the conviction rate for well planned, professional arson activities is likely to be extremely low. If arson indeed occupies a place on the fringe of "legitimate" business, then action clearly should be taken to change that image, both in terms of removing the profitability of arson (cf. Rottenberg, 1976) and in educating the public on the seriousness of arson as a criminal activity.[2] The terms "arsonist" and "criminal" should be closely linked. Many upstanding community members may be reluctant to engage in activities which result in their being branded as criminals.

There is little in the psychological or psychiatric literature about arson-for-profit, presumably because it is considered a rational act, and thus not of great interest from a psychological standpoint. It does indeed seem reasonable to classify arson-for-profit firesetters quite differently from other types of firesetters, some of them more interesting to the behavioral scientist than others. If we can ask what are the high risk

economic factors in arson-for-profit, it also may be reasonable to ask what are the high risk psychological factors. Are there types of people who can be identified as a high risk for fraud arson in certain types of situations? What makes a person turn to criminal acts to solve financial problems, and why do some people become "torches" or arsonists-for-hire? While the economic explanations are obvious, there also may be other contributing factors of interest to the psychologist. For example, an entrepreneur, in order to realize rapid economic gains or to support an'expensive life style, may engage in very risky financial practices. Because of these activities his business may do poorly or he may find himself short of cash, and as a result he may set fire to his business to collect insurance. The factors surrounding his risk-taking and expensive life style may be more significant than the immediate economic incentives in explaining why he sets fire to his business. Robbins and Robbins (1967) reported that some insurance defrauders have even been found to be psychotic, although they did not elaborate on this claim. At this point we simply do not know a great deal about the psychological aspects of arson-for-profit, and this is an area which needs a great deal more research.

Solitary Firesetters

Firesetters who set fires in secret (excluding those with a profit motive) represent the group most widely studied by researchers. Fires set by individuals in this group are most likely to be described as "psychologically motivated," primarily because to an observer the act of firesetting often appears to be irrational or at the very least an extreme reaction to any events which may have precipitated it. Lewis and Yarnell (1951), in their monumental study which included over 1300 firesetters, classified "firesetting because of mental reasons" into five major groups:

1. Accidental or unintentional group. Firesetters who set fires during a temporary or confused state or because of a lack of judgment due to feeblemindedness.
2. Delusional group. Psychotic firesetters who set fires because instructed to do so by hallucinated voices or while under the delusional influence of ideas of "purification."
3. Erotic group. Pyromaniacs and firesetters who derive direct sexual pleasure from firesetting and watching fires.
4. Revenge group. Firesetters who set fires to avenge a wrong, either real or imaginary.
4. Children's group.

Within these categories a number of subcategories were discussed. Inciardi (1970) proposed a typology for adult firesetters, which he did not further subdivide. His six categories of adult firesetters were revenge firesetters, "insurance-claim" firesetters, vandalism firesetters, and firesetters who use arson to cover up another crime.

The following discussion reviews some of the categories proposed by Lewis and Yarnell (1951) and points to differences between the system of classification used by those authors and that used by Inciardi (1970). However, the discussion of these classification systems will be brief and mainly for illustrative purposes. They have been often quoted but not widely employed and, as will be discussed later, their difficulties may outweigh their usefulness. The following discussion centers mainly on adult male firesetters; firesetting in children, adolescents, and females will be discussed in separate sections.

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Motivated Firesetting

Firesetters in this category generally are aware of some specific motive, or reason, for setting the fire, and the fire is usually set to the property of a person or persons by whom the firesetter believes he has been wronged. In this group, Lewis and Yarnell included jealousy-motivated fires, suicidal firesetters, fires centering against the mother and other family members, fires against the employer, and fires to defend personal or family reputation. They also included in this group fires set by inmates of institutions and a few cases of grandiose paranoid firesetters with religious motives. This latter group might better have been included in the psychotic group of fire-setters (see below). Inciardi's (1970) categories of revenge firesetters and institutionalized firesetters would probably encompass most of the cases of motivated firesetting described by Lewis and Yarnell.

A striking feature of the category of motivated firesetters is the range of motives which the firesetters gave for their acts. The stated reasons for setting fire to their victims' property ranged from real to imaginary, and from very trivial reasons such as a mild problem with an employer to the more traditional motive of jealousy toward a lover or competitor in love. Lewis and Yarnell stated that, while in some instances the desire for revenge seemed somewhat justified, "in all instances, the resulting damage was more serious than the possible grievance might warrant" (Lewis & Yarnell, 1951, p. 64). One case which exemplifies the weak excuses often given by fire-setters for their acts concerns an 18-year-old male who set fire to his employer's barn, destroying 20 cows and three horses. He stated that the employer's wife gave him "'left-over food from the table'" (Lewis & Yarnell, 1951, p. 65).

Lewis and Yarnell included suicide as a motive for firesetting, while suicidal firesetters were not included in Inciardi's (1970) sample. None of the cases described by Lewis and Yarnell were actually suicides, since the victims lived, but suicide notes, statements made by the firesetters, and circumstances surrounding the fires suggested that they were suicide attempts. Davis (1962) presented the cases of five successful suicides in Dade County, Florida. All of the victims had histories of psychiatric problems; two had histories consistent with schizophrenic behavior and two had been diagnosed as depressed. Davis pointed out that, while suicide by fire appears to be a rare event in this country, it is relatively common in other cultures, notably the Middle East and Cuba. He suggested, though, that suicide by fire may in fact be more frequent in this country than is commonly thought, and that it is not often enough considered seriously as a possibility by investigators of fire deaths.

"Pyromaniacs"

This largest group of firesetters reviewed by Lewis and Yarnell--about 60% of their sample--were described as "offenders who said they set their fires for no practical reason and received no material profit from the act, their only motive being to obtain some sort of sensual satisfaction" (Lewis & Yarnell, 1951, p. 86). To varying degrees, a large number described some force within them--an "irresistible impulse"--which compelled them to set fires. Lewis and Yarnell suggest, however, that one should exercise caution in accepting the "irresistible impulse" explanation for firesetting, since the term is a favorite of reporters, detectives, and psychiatrists, and thus this reason for setting fires may have been suggested to offenders during an investigation. In some states the "irresistible impulse" has been used as a legal defense (Cleckley, 1959).

In fact, about one-third of the offenders in this group offered some excuse for their acts, such as a desire to help firemen, to become heroes, or simply that they enjoyed the destruction of property. The heroism motive is epitomized by "would-be hero" firesetters, whom Lewis and Yarnell describe as "the little men with grandiose social ambitions whose natural equipment dooms them to insignificance" (Lewis & Yarnell, 1951, p. 228). Setting fires offers an opportunity to achieve community recognition for turning in an alarm or helping the firemen. Recognition and importance derived from "heroic" deeds also may be a factor in firesetting by volunteer firemen and fire "buffs" who hang around firehouses. The enjoyment of destruction may be best exemplified by vagrant firesetters, whom Lewis and Yarnell describe as some of the most dangerous of the firesetters, in terms of resultant property damage. These tended to be literal wanderers who had completely severed their home ties.

Even where the "irresistible impulse" was the only reason offered for firesetting, Lewis and Yarnell contend that one or more of the above motives was probably operative. Some firesetters also said that they wanted to see fire engines, while a few apparently derived sexual satisfaction from watching their fires. In general, where reasons for firesetting were given, these were not as specific as the reasons given for fires motivated by revenge or jealousy, and the explicitness and level of awareness of a motive appear to be the major distinction between the "pyromaniacs" and the "motivated" fire-setters. Seldom was there a specific intended victim, although Lewis and Yarnell stated that the desire for revenge was never entirely absent. Fire-setters described as "pyromaniacs" were more likely to set their fires in a more disorganized fashion, with whatever materials were available.

The notion of the "irresistible impulse" is probably best conveyed by a passage from Lewis and Yarnell (1951):

> These are the mysterious "firebugs" who terrorize neighborhoods by going on solitary firesetting sprees, often nocturnal, during which they touch off trash fires in rapid succession without regard to whose property is endangered. The reasons for the fires are unknown; the act is so little their own that they feel no responsibility for the crime. . . . These offenders are able to give a classical description of the irresistible impulse. They describe the mounting tension, the restlessness, the urge for motion, the conversion symptoms such as headaches, palpitations, ringing in the ears, and the gradual merging of their identity into a state of unreality; then the fires are set . . . . Once they have started the fires, thrown the neighborhood into confusion, and are assured the fire-engines are working, the tension subsides, and they can go home and drop into a peaceful sleep. (p. 87)

Many of Lewis and Yarnell's sample were considered "mentally defective"-- what we would call today mentally retarded or developmentally delayed. In an earlier paper, Warner (1932) specifically excluded this group from his defi-nition of pyromania, but his description of the irresistible impulse is very similar to that of Lewis and Yarnell:

> Under pyromania we consider only cases which present no conscious motivation. They [those classified as pyromaniacs] cannot as a rule give

any adequate reason for the act and seldom even attempt to rationalize it. The act of the pyromaniac is so little his own that even if otherwise of a normal nature he is unable even to display the proper regret. He will tell you he does not know why he did it, that an indefinable thing within him forced him to commit the act. (Warner, 1932, p. 675).

While "pyromaniacs" made up about 60% of Lewis and Yarnell's sample, only 34% of a later sample (excluding cases of fraud arson and arson to cover up another crime) collected by Robbins and Robbins (1967) were identified as cases of pyromania. Inciardi (1970) had no such classification, although some of the cases appearing under the "excitement firesetter" category may have fit the classical description of pyromania. An assessment of this possibility is difficult, since Inciardi does not provide an extensive description of the characteristics of various categories of firesetters. It is possible that these differences between samples reflect the different times at which the samples were collected, or that some cases of what Lewis and Yarnell would call "pyromania" are embedded in other categories in the Robbins and Robbins (1967) and Inciardi (1970) samples. More than likely, however, the differences between samples reflect biases in the manner in which the samples were collected, an issue which will be discussed later.

Psychotic Firesetters

Lewis and Yarnell (1951) stated that this group "seemed distinctive, in that their fires were set for suicidal purposes, their motives were apparently delusional in character or they manifested bizarre behavior during or immediately after the firesetting" (p. 376). The statement that the fires were set for "suicidal purposes" apparently reflects the fact that many of the individuals described in this group set fire to their own houses or other personal property. However, Lewis and Yarnell also described a number of cases in which property belonging to someone else was set on fire. Several cases were also described which involved insurance fraud or crime cover-up in addition to bizarre behavior. Further confusing the matter, Lewis and Yarnell stated that the majority of males who could be considered psychotic, including the entire group of schizophrenic firesetters, had actually been included in the other categories, because they seemed to naturally belong there. The remaining cases described as psychotic involved primarily cases described as alcoholic or various organic psychoses. What Lewis and Yarnell seemed to be saying was that, despite the relatively bizarre behavior which may have made them stand out somewhat, most of the psychotic firesetters fit into the categories already described and probably did not represent a separate class. Inciardi (1970) did not describe anything like a class of psychotic firesetters, and again it is not clear if this represents a sampling bias or whether cases which might be described as psychotic were embedded in the other categories.

Virkkunen (1974) examined the case records of a group of 30 schizophrenic arsonists and a control group of 30 nonschizophrenic arsonists who had been examined at the Psychiatric Clinic of the Helsinki Central Hospital. He found "hate" to be the predominant motive for both schizophrenics and controls. However, for the controls, the hate motive appeared to be directed primarily against relatives and acquaintances, whereas schizophrenics "directed their hate more often against outsiders or the community as a whole." The majority of schizophrenics were likely to have set their fires to objects or buildings which were unoccupied by other people at the time of the fire, while the majority of controls set fires to residential houses. As might be expected,

schizophrenics were considerably more likely to be described as having set their fires as a result of hallucinations or delusions than were controls. Controls were more likely to have set their fires under the influence of alcohol than were the schizophrenics.

Comparisons between the two samples in Virkkunen's (1974) study should be treated with some caution for two reasons. Firstly, the two samples cover markedly different time periods. The schizophrenic sample covered cases from 1918 through 1972. The control population, on the other hand, was much larger, and the 30 sample cases covered the period 1963 through 1972. Thus, because of the relatively longer period of time covered, a number of factors such as diagnostic and case referral practices may have varied considerably more in the schizophrenic sample than in the control sample. Secondly, while Virkkunen included in his schizophrenic sample only those cases which had both been diagnosed as schizophrenic and met the investigator's criteria for schizophrenia, no information on psychiatric classification was given for the control sample. Presumably those cases would not have been referred to the psychiatric clinic if there had not been some suspected psychiatric problems. Despite these limitations, Virkkunen's findings raise some important issues relating to the classification of fire-setters. If one considers the use of alcohol, the presence of delusions or hallucinations, the types of structures burned, or the object of the hate motive, then schizophrenics could be said to differ markedly from controls in Virkkunen's study. However, based on the dominance of the "hate" motive, the majority of both schizophrenics and controls would fall into the same category. The latter strategy appears to be the principal one adopted by Lewis and Yarnell (1951), who classified firesetters primarily by motives. This strategy is useful if the motive is in fact important, and if other factors turn out to be relatively unimportant. If this is not the case, however, then it follows that important distinctions between firesetters may be overlooked.

Group Firesetters

Moll (1974) described three types of fires which are set by groups: political fires, vandalism fires, and riot fires. Political fires are pre-meditated and set to dramatize an issue, embarrass authorities or political opponents, or intimidate or extort for political reasons. Vandalism fires are often set by pairs or groups of boys in the presence of others from a peer group. Many such fires are set by adolescent groups, and Moll believes that such fires are set for excitement rather than destruction. Lewis and Yarnell (1951) made a similar observation, but they also noted groups of adolescent firesetters who seemed to set fires for reasons similar to those of the solitary firesetters. Their study found about twice as many adolescent firesetters who worked in groups as who set solitary fires. Many adolescents seemed to set fires in pairs, one boy in a dominant role and the other submissive.

Riot fires are set during outbursts of group violence when there is tension and social unrest. However, individual members of the group may show different actions: Some loot, some attack police, and some set fires (Conant, 1970). There is little information as to why one particular activity is selected over others. Georges (1975) studied arson during the Newark riots of 1967, and in addition to considering arson in that case as a collective act, he also viewed it as criminal behavior independent of collective action. Indeed, many of the factors associated with arson in the

1967 riots appeared to be similar to those which will be associated with solitary firesetting in later sections of this paper.

A fourth type of group firesetting, described by Lewis and Yarnell (1951), is firesetting by groups of volunteer firemen. These fires may be set because of the community recognition, as well as excitement, that they generate for the firemen. Lewis and Yarnell described cases in which fires were set as a result of intense rivalry between fire companies. They also point out, however, that generally volunteer fire departments have served their communities well.

Female Firesetters

Females made up only 14.8% of Lewis and Yarnell's (1951) sample, and very few females have appeared in most other studies of firesetters. Only two of the 60 firesetting children reported by Yarnell (1940) were females, and one of the four adolescent firesetters studied by Macht and Mack (1968) was female. Awad and Harrison (1976) presented a single case study of a young female firesetter. The relatively scant attention paid to female firesetters in the literature may in part reflect the generally lower arrest rates for criminal activity among female adults (Herjanic, Henn, & Vander-pearl, 1977) and children (Monahan, 1970). It may also reflect the considerably lower interest, at least among children, shown by females in fire play, fire fantasy, and fire-related activities (Block, Block, & Folkman, 1976).

Thus firesetting appears to be an activity engaged in predominantly by males. This has not always been the case, however. Lewis and Yarnell (1951) reported that in the earliest literature, during the 18th and 19th centuries, arsonists were often servant girls who set fire to their master's house. It was generally assumed they were suffering from anxiety of menstruation, depression of puberty, separation from their families, and the general harshness of their lives.

Lewis and Yarnell (1951) found the range of motives for female firesetters to be similar to that of males. However, there were some notable differences. In contrast to males, no cases were found in which females set fires in groups, and they rarely turned in alarms or helped to fight the fires. Instead, the "heroism" motive often involved a dramatic fire in which they were the "heroic victims." Lewis and Yarnell reported that some women "staged a bizarre fire (usually set to their own property, it should be noted) where they appeared, sometimes fantastically dressed for the occasion, as part of the drama" (p. 347). Occasionally, fires appeared to result from anxieties over pregnancy. Anxiety over menstruation was found only in the older female firesetters, apparently because "the removal of the secrecy and superstition about physiological phenomena seems to have reduced the adolescent anxiety about menstruation" (p. 348). Lewis and Yarnell also noted that differences between the types of fires set by males and females were not apparent before adolescence. Thus, they included their juvenile female firesetters in the children's group.

Tennent et al. (1971) studied 56 female arsonists in the English Special Hospitals along with a control group matched for age (over 14) and length of hospitalization. Most of the firesetters were adults, with a mean age of 25.8 years and a mean length of hospitalization of 20.1 months. The motives for firesetting were most often identified as revenge and "response to conflict with authority." As in the children's and adolescent groups described earlier, a high incidence of early parental separation was

noted, although separation from the father and the mother were equally common. As in Lewis and Yarnell's study, "the majority of acts were against their own property, or at least the area of property symbolically owned by them within an institution" (Tennent et al., 1971, p. 501). The presence of behavior problems other than firesetting was also common, a finding typical of male arsonists as well. By various measurements, female arsonists appeared to be more depressed than controls. Suicide and self-mutilation had been attempted by more than half, although the incidence did not differ from controls.

Youthful Firesetters

Although serious firesetting in children has generally been considered rare, youthful firesetters have received more attention in the literature than perhaps any other single group. Virtually all of the information in earlier studies was gathered in the context of psychiatric treatment. Yarnell (1940) reported some general findings in a study of 60 firesetters under 16 years of age. Two major age groups were identified: Sixty percent of the sample were children 6-8 years of age, while 35% were young adolescents 11-15 years of age. The young children usually set their fires in and around the home, with associated fantasies of burning some member of the family who had withheld love or who was a serious rival for parental attention. However, even when firesetting acts appeared to be directed against a family member, Yarnell considered the fires to be chiefly symbolic, since they caused little damage and the children immediately became anxious and either called for help or extinguished the fires themselves. Vandersall and Wiener (1970) also found that children's fires in their study usually did not cause serious damage, but further noted that the discovery of the fires sometimes seemed accidental. Bender (1959), in reviewing the cases of 33 children and adolescents who had killed, believed that the firesetting deaths in her sample were unintentional, although she noted that a number of children who had killed by other means than fire had also been firesetters.

In contrast to the younger children, the young adolescents in Yarnell's (1940) study set their fires away from home, chiefly for excitement, and they often set their fires in pairs or groups. Fires set by this group often resulted in serious damage. Similarly, Lewis and Yarnell (1951) noted a shift from predominantly home-centered fires to fires set away from home with increasing age of the firesetter. Frequent targets of males between 12 and 16 years of age included homes of strangers, churches and schools, factories, and trash or brush. Of children who set fire to schools, the greatest incidence in the Lewis and Yarnell sample occurred in the 12-14 year age group, and only a few instances of this type of fire were set by children under 10 years of age. According to Lewis and Yarnell, the stated motives for firesetting by these young adolescents were usually revenge connected with school-related problems. Frequently, firesetting had been preceded by stealing, vandalizing, and harassment of the teacher.

Many aspects of youthful firesetting will be considered later in this paper, where comparisons may be made with material on adult firesetters. Some important findings nevertheless deserve consideration at this point, either because of the consistency with which they have been reported or because they lay the groundwork for later discussion.

Yarnell (1940) reported that the youthful firesetters in her group had terrible dreams involving the devil and ghosts and an unusually rich fantasy life involving aggression and magical powers over adults. Other writers

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have also reported a variety of such morbid fantasies and dreams of fire-setting children (Lewis & Yarnell, 1951; Silverman, 1957; Rothstein, 1963; Siegelman & Folkman, 1971). While Vandersall and Wiener (1970) reported difficulty in obtaining fantasy statements from children during interviews, the use of projective techniques and play therapy have often proven helpful in eliciting children's fantasies (Nurcombe, 1964; Rothstein, 1963; Siegelman & Folkman, 1971; Yarnell, 1940). The Siegelman and Folkman (1971) study is especially important in this regard, since it was the only well-controlled study in this group. Children who were considered more serious firesetters by virtue of the number of fires they had set showed more fire-related responses to selected Thematic Apperception Test cards than did children who had set only one fire or who had no firesetting history.

Firesetting is not a single, isolated behavior problem in these children. In fact, a number of studies have reported that firesetting was rarely the major referral problem (Nurcombe, 1964; Vandersall & Wiener, 1970; Yarnell, 1940). One or more of the following problems were also usually observed: hyperactivity, running away from home, truancy, stealing, destructiveness, and aggression. As Vandersall and Wiener (1970) put it, firesetting "most often emerged as only another symptom among other indications of poor impulse control and a more generalized behavior disturbance" (p. 69). More recently, Patterson (1978) provided evidence suggesting that defiance, lying, wandering, stealing, and firesetting form a transitive progression of delin-quent behavior categories, such that children exhibiting a given category of behavior will also be likely to exhibit behavior falling lower on the pro-gression. Thus, a child who lies is also likely to be defiant; a child who wanders is also likely to lie and be defiant, and so on. In both an initial study and a replication, firesetting was the highest category in the progres-sion, indicating that children who set fires show the greatest number of delinquent behavior symptoms. Kaufman, Heims, and Reiser (1961) concluded that firesetters in their study were the most seriously disturbed children they had seen in their research program on juvenile delinquency. Their sample consisted of firesetters who had set multiple fires, and two-thirds of the children were considered to be either overt or borderline schizophrenics.

These youthful firesetters typically reside with disturbed families. Parents of youthful firesetters have been variously described as indifferent, unresponsive, rejecting, aggressive, or overly punitive (Nurcombe, 1964); selfish and depriving the child of love and security in the home (Yarnell, 1940); alcoholic, abusive, and psychotic (Kaufman et al., 1961). Of 21 juvenile firesetting cases, Nurcombe (1964) found only one case in which he considered both parents to be "primarily adequate, affectionate, mature, accepting or consistent figures" (p. 583). Vandersall and Wiener (1970) found that mothers of firesetting children "were, to varying degrees, affectively distant, rejecting, ineffective, and in some cases overprotective" (p. 65). That same study reported a high incidence of father-absence from the home, a fairly typical finding in the studies on juvenile firesetting and perhaps the most objective evidence of family disturbance. In 50% of the cases, the father had been absent for many years. In other cases, the fathers were frequently away from home, and when they were home they were uninvolved and distant, and in some cases demanding, complaining, and critical. A similar pattern of disturbed relationships with the father was noted by Kanner (1957). Macht and Mack (1968) studied four adolescent firesetters and found that in all cases the fathers, who had previously been associated with fire in some way in their occupations, were absent from the family. Macht and Mack

suggested that firesetting had symbolically served to re-establish a lost relationship with the father. Later in this paper we will examine in some detail the importance of disturbed environments in general, and father absence in particular, in firesetting in both children and adults.

In general, the previously described studies were descriptive of various samples of firesetting youths without reference to population norms and usually with little objective data to support subjective impressions. However, data from a study by Siegelman (1969) generally confirm and extend these earlier findings. Siegelman reasoned that multiple firesettings by a child probably are an indicator of seriously disturbed family background and personality characteristics. Single instances of firesetting, on the other hand, might represent a largely fortuitous result of a child's natural curiosity about fire which got out of hand, or, even when the firesetting was deliberate, a single, acute episode in which the disturbance was not very extensive. Thus, she compared various characteristics of a group of recidivist male firesetters, 6-12 years old, who had set two or more fires, with a group who were known to have set only a single fire. The findings of this study were combined with the findings of a group of children who were not known to have set any fires and summarized in a separate, briefer report (Siegelman & Folkman, 1971).

Data sources included a self-administered questionnaire filled out by mothers of the children, an open-ended interview of the mothers conducted by a trained interviewer, an adjective checklist to provide an objective measure of terms used by the mothers to describe their children, and an administration of the Thematic Apperception Test (TAT) to the children to explore their fantasy productions. The administrator of the test did not know which of the children belonged to the recidivist group and which belonged to the non-recidivist group. The major findings are described below.

As expected, recidivist (R) and non-recidivist (NR) groups showed some striking differences. On a number of measures, R group families appeared to be more disturbed than NR group families. Fathers of R firesetters were more often absent from the family than were fathers of NR firesetters, or when present they tended to be noncommunicative. Mothers of R children displayed both very strong positive and negative feelings about their sons. In contrast, mothers of NR children, while generally positive toward their sons, displayed less extreme feelings, both positive and negative. They were characterized as more accepting of their children than were R mothers. Other features which characterized R families were a higher incidence of marital discord, serious health problems among parents, and another member of the family having previously sought psychiatric help. R families were generally larger than NR families, were lower on the socioeconomic scale, and R children were more likely to be middle children.

As has been reported in previous studies, firesetting is not an isolated problem. Recidivist firesetters were more likely to have problems in school, to fight with other children, to lie, to steal, and to destroy property than were non-recidivist children. The reports of these rather specific problems more or less mirrored the greater tendency of R mothers to describe their children as impulsive and as "poor losers." One finding which appears to differ from previous studies is that both NR and R children set fires principally away from home. Yarnell (1940), Lewis and Yarnell (1951), and Nurcombe (1964) have all emphasized firesetting in young children as a principally home-centered activity, although Yarnell reported that the children's firesetting often began away from home.

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Medical histories showed that R children had a greater incidence of physical problems than did NR children, with the exception of accidents, hearing difficulties, and bedwetting. Especially striking was the greater incidence of allergies and respiratory difficulties among R children. Mothers of R children reported their children to be less capable than did NR mothers.

Children's fantasy behavior based on TAT responses tended to be consistent with the findings of previous studies. R children tended to see more violence, death, murder, and suicide than did NR children. Content also reflected a preoccupation of R children with escape, parting or quarrelling couples, and children who were punished, lost, had run away, or were afraid. These are themes not uncommon in the previously reported literature. The non-firesetting control group saw less violence than either the R or NR groups.

Based on the descriptions of the 14 most serious firesetters of the R group--those who had set three or more fires--the authors arrived at a preliminary typology of the youthful firesetter. One subgroup was characterized as an impulsive, acting out group, in which firesetting was associated with anger, destruction, and behavior problems. The other subgroup was characterized as a withdrawn group. This second group, while in many ways similar to the first group, were characterized as loners, with a primary symptom of anxiety rather than overt anger. Siegelman and Folkman suggest that this is only a preliminary differentiation, and that a clear-cut typology could hardly be achieved with so few children studied. Perhaps the more striking differentiation is between the recidivist and non-recidivist groups. Although the single firesetters group shared some characteristics of both the recidivist group and the non-firesetting children, Siegelman and Folkman reported that the single firesetters were generally more like the non-firesetters. They suggest that their findings and the results of future research may be employed to screen children who have already set one fire in order to identify those who will require more intensive intervention: "Having set one fire, a child coming from a disturbed family situation, who is having difficulties in school, and shows some of the psychological or medical problems noted is a high risk candidate for recidivism" (Siegelman & Folkman, 1971, p. 6).

While Siegelman and Folkman concentrated their research efforts mainly on differences between groups of known firesetters, Kafry (1978) examined firesetting in a group of unselected school children. Interviewing both the mothers and the children themselves, she found that 21% of the children had set fires, and that the major factor associated with firesetting was playing with matches. All the children who set fires also had played with matches. Family and personality characteristics which had been associated with firesetters were also associated with children who played with matches. A comparison of children who had set only one fire with the small number of children who had set multiple fires revealed no statistically significant differences in personality or family characteristics (Kafry, personal communication).

While some differences between the findings of Kafry (1978) and Siegelman and Folkman (1971) reflect differences in the sample of children selected, they also reflect fundamentally different approaches to the study of firesetting in children. Siegelman and Folkman were concerned with a detailed description of the characteristics of known firesetters. Kafry, on the other hand, was primarily interested in examining firesetting in the broader context of hazardous behavior of children. Both studies are important contributions to the

literature on youthful firesetting in that they established an empirical basis for their findings, and we will refer to details of the studies throughout the remainder of this review. Future research in this area may be geared toward including more family members in the data-gathering process, and in providing direct observational data on youthful firesetters and their families.

Important Issues in the Classification of Firesetters

Throughout the discussion of classification, a number of comments have been made concerning some of the difficulties in characterizing the various categories of firesetters described by Lewis and Yarnell (1951) and Inciardi (1970), and in comparing the two systems of classification devised by these authors. These difficulties revolve around two major issues: sample bias and the meaningfulness of the categories. A more detailed discussion of these issues may help to clarify some of the problems in past research and to suggest some improvements which may be made in future studies.

Sample Bias

Sample bias simply refers to the many uncontrolled factors which may cause a given sample of firesetters to be unrepresentative of the total population of firesetters. For example, Lewis and Yarnell (1951) reviewed a large number of cases from the files of the National Board of Fire Underwriters, along with cases reported from various fire marshalls, psychiatric clinics, and institutions. They also followed current arrests in the New York City area. Inciardi (1970), on the other hand, reviewed the cases of all sentenced arson offenders who were released from the New York State prisons from 1961 through 1966. These differences in sampling methods may help to account for why there is no category in Inciardi's typology which corresponds to the large group of "pyromaniacs" found by Lewis and Yarnell. It seems reasonable that the "pyromaniacs" would be more likely to wind up in psychiatric institutions than in prisons, and thus would be more likely to be picked up in a sample in which arson cases have been identified prior to disposition by the courts, such as that of Lewis and Yarnell. In Inciardi's study, the revenge motive predominated, covering approximately 58% of his adult sample. While the "pyromaniacs" predominated in Lewis and Yarnell's sample, if those cases are eliminated from the sample, the revenge category then becomes the dominant category, occupying a percentage of the remaining sample comparable to that which Inciardi observed.

These considerations seem to suggest that Lewis and Yarnell's (1951) sample is more representative of the total population of adult firesetters than is that of Inciardi (1970), which is probably true. However, there are also likely to be a number of biases within the Lewis and Yarnell study. For example, the authors stated that many of the cases in their report were outstanding examples suggested to them by the various sources they consulted. The very fact that these cases were considered outstanding may mean that many of the characteristics of these firesetters are unrepresentative of the population. Another biasing factor concerns the information available on the individual cases. Despite the fact that Lewis and Yarnell vigorously followed up each case, attempted to determine the individual's current status and whereabouts, and in many cases interviewed the individual, it nevertheless remains that they relied heavily on case records for their information. Thus their data were guided, or at the very least limited, by someone else's determination of what was important. This problem is certainly not unique to their study. Similar kinds of problems exist in most of the literature on firesetting and in this type of research in general.

Levin (1976) pointed out a further, and perhaps most important, source of sample bias: Most arsonists simply are not apprehended. Indeed the percentage of cases of arson which are detected, in which the perpetrator is apprehended, and which result in a conviction is apparently lower than for other types of crimes (Moll, 1974). Prosecutors are often reluctant to prosecute an arson case unless the evidence against the accused is extremely strong, since obtaining a conviction is very difficult. Thus, any sample of arsonists who have been remanded by a court to a correctional institution or psychiatric facility (from which sources most samples of adult firesetters are taken) is likely to contain those individuals who have left the clearest trail of evidence leading to themselves--those who are least capable of avoiding detection or who make little or no attempt to avoid detection. Those firesetters who successfully avoid detection may, as a group, show some quite different characteristics than those who are caught. There is, of course, no immediate practical solution to this type of problem. Researchers should nevertheless be aware of this source of sample bias.

Before leaving the topic of sample bias, we should discuss one last issue which could be a source of confusion in the firesetting literature. This is the commonly held belief that firesetting is a behavior primarily of the adolescent and young adult. Indeed, 58% of Lewis and Yarnell's (1951) sample were 30 years of age or younger at the time of arrest. However, in the entire population of the United States there were relatively more people in these age groups at the time the sample was gathered. Thus, the relatively high frequency of young offenders in the Lewis and Yarnell sample at least partially reflected the relatively larger number of young people in the population. The percentage of young people is likely to be even higher in segments of the population which might be identified as being high-risk groups for arson, such as low socioeconomic groups (Hurley & Monahan, 1969; Inciardi, 1970; Wolford, 1972).

Nevertheless, population characteristics alone could not possibly account for the large group of young offenders in Lewis and Yarnell's sample. There are, however, some biasing factors which could result in a disproportionally large number of young offenders in the sample. One of these is that young offenders are perhaps less likely to have the resources to avoid detection than are older offenders. An example would be the case of a 17-year-old who had only enough money to buy a few gallons of gasoline from a nearby station. Investigators would be likely to check service stations in the area to see if anyone had recently filled a gasoline can, and would thus have a description of the suspected incendiarist. Another possible factor is that, in this rather select group of individuals who are prone to firesetting and who do little to avoid detection, young firesetters who are apprehended are likely to be taken out of circulation and thus would be unavailable to set fires at a later age. This would seem especially to be the case with the "pyromaniacs" who seem to have serious psychiatric problems and have perhaps set a number of serious fires. It may be that, in fact, young people set a disproportionately large number of incendiary fires. However, given the relatively small number of firesetters who are caught and the biases that are probably inherent in samples of arrested offenders, one should exercise caution in concluding that serious firesetting is somehow characteristic of adolescents and young adults, or that that particular period of life is in any special way a determining factor in firesetting.

Meaningfulness of Classification Categories

There is nothing exclusive about the differences between categories of firesetters described by Lewis and Yarnell (1951). Inordinate fascination with fire, the "irresistible impulse," the revenge motive, bizarre or psychotic behavior, and the importance of the consequences of the firesetting act were characteristics which appeared throughout their sample, perhaps with differences in emphasis on one characteristic or another rather than differences in substance defining the various firesetting categories. Lewis and Yarnell originally set out to study the pure "pyromaniac"; however, they were so impressed with the similarities across the various groups of firesetters that they finally excluded only arson-for-profit and crime cover-up arson from their sample, and even a few of these types were finally included.

Thus, the classification of firesetters by Lewis and Yarnell may represent a rather arbitrary division of a group of individuals who show similar characteristics. Moreover, as we pointed out in the discussion of Virkkunen's (1974) study, classification of firesetters by a single overriding characteristic such as the revenge motive may mask some important differences between individuals within a given group. This method of classifying firesetters is not inherently incorrect, if it can be shown that the categories are in some way meaningful; for example, that they lead to some sort of decision, or that a treatment prognosis can be made. Clearly, also, the particular uses of a classification system may not be readily apparent at its inception; yet, since the publication of the Lewis and Yarnell study in 1951, there have been no studies which have examined the viability of their classification system, nor have there been any attempts to improve upon it. A similar statement can be made concerning Inciardi's (1970) typology.

It would be overstating the case to say that previous attempts at classification should be considered meaningless. Indeed, Lewis and Yarnell subdivided their categories of firesetters in ways that could provide some useful information about the types of firesetters they were describing. Yet, a more fruitful approach to classification might be to consider the entire set of factors associated with the firesetting act. These factors fall into four major categories: antecedent conditions, certain organismic factors, the actual firesetting behavior, and the consequences of the firesetting act. The categories are similar to those described by Goldfried and Davison (1976) in their basic model of behavioral assessment.

Antecedent conditions refer to the individual's physical and social environment, and to events which may have precipitated the firesetting. Organismic factors are those personal variables which the individual brings into any situation. These include such things as age, sex, intellectual abilities, genetic factors, physical disabilities, alocoholism, associated behavioral and psychiatric problems, and cognitive factors. A consideration of the actual firesetting behavior includes the degree and sophistication of preparation, the materials used, the location of the fire, the structures burned, and whether the firesetter flees or remains at the scene of the fire. The consequences of the firesetting act are those events which follow the firesetting and may serve to reward or otherwise maintain firesetting behavior. These include the warmth and visual stimulation of the fire itself, the confusion created by the fire, praise from peers, praise from authority for helping to put out the fire, and economic gains.

The most important feature which distinguishes this approach from previous approaches to classification of firesetters is that a number of important factors, rather than a single common factor, may figure into the classification

process. Consideration of the multiple determinants of firesetting behavior makes it less likely that important variables which differentiate types of firesetters will be ignored. For example, two firesetters might fall into the "revenge" categories in the Lewis and Yarnell (1951) or Inciardi (1970) systems. Yet on closer examination we may find that for one of the fire-setters, the presumed transgressions deserving revenge appear to be quite imaginary, while for the other firesetter we may be able to identify im-portant environmental events which may have contributed to the firesetting act. Our inclination would then be to weigh the importance of immediate environmental precursors more heavily, or at least differently, for one than for the other, and also to look for other important distinguishing charac-teristics among the organismic, behavior, and consequence factors.

Of course, correlations between factors may be observed, insofar as certain factors are likely to determine other factors. We might expect, for example, that a person's attitudes, beliefs, and expectations will have an important influence on his social environment, and vice versa. To the extent that factors cluster into recognizable patterns, or "profiles," types of firesetters may be identified. Just what these types will look like is difficult to ascertain at this time. Certainly the pitfalls of classifica-tion which we described earlier have not been entirely removed. A great deal will still depend on how researchers conceptualize the problem, and the kinds of distinctions between firesetter characteristics that researchers make. Yet we agree with Macht and Mack (1968) that an understanding of fire-setting behavior depends upon our understanding of the multiple determinants of that behavior. In the following sections, which are organized along the lines of the assessment model we have presented, we have critically reviewed what previous research has suggested these determinants might be.

ANTECEDENT ENVIRONMENTAL CONDITIONS

By antecedent conditions, we refer to those features of the immediate environment which may contribute to the firesetting act. Antecedent condi-tions are important because behavior does not occur in a vacuum; it is inextricably related to the environment in which it develops. Behavior may recur when features of the environment in which it originally developed recur. Perhaps more importantly, certain types of environmental conditions maximize the likelihood of the development of deviant behavior patterns, and these behavior patterns in turn may tend to perpetuate or otherwise adversely affect the environment. This reciprocal relationship between behavior and the environment will be further outlined in the section on theoretical issues. What is important is that a thorough analysis of environmental conditions is essential to an understanding of the firesetting act.

As has been previously noted, the literature on youthful firesetting has emphasized the fact that youthful firesetters tend to reside in distressed families. This family distress may be seen in a number of ways: parental indifference, abuse, and rejection. A number of studies have noted the high frequency with which the fathers of young firesetters were completely absent from the family or were frequently away (Kanner, 1957; Macht & Mack, 1968; Nurcombe, 1964; Siegelman & Folkman, 1971; Vandersall & Wiener, 1970). Macht and Mack (1968) suggested that firesetting may represent a symbolic identification and reuniting with the lost father.

An alternative interpretation, however, is that the absence of the father has more to do with a general lack of proper parental attention. Shinn

(1978), for example, reviewed a large number of studies examining the effect of father absence on children's intellectual performance. She concluded that the bulk of the evidence suggests that father absence has a detrimental effect on intellectual performance, but that the deficit is likely a result of anxiety and a more general lack of parental attention rather than anything specific to the absence of the father. The same conclusion may hold for the case of youthful firesetters. The high percentage of father absences may reflect the fact that when parents are separated, the mother usually retains custody of the children. Similarly, it is usually the father, and not the mother, who is frequently away on business. The notion that lack of parental attention is the critical variable in father absence is also more consistent with the finding that the more serious, multiple firesetting children are usually middle children in large families (Siegelman & Folkman, 1971), who perhaps receive less parental attention than their oldest or youngest siblings. Several studies have reported unusually close affectional bonds or overprotectiveness on the part of mothers toward their firesetting children (Macht & Mack, 1968; Siegelman & Folkman, 1971; Vandersall & Wiener, 1970; Yarnell, 1940). While this would seem to be a natural compensation for an absent or unresponsive father, it might nevertheless fail to adequately meet a child's need for parental attention and guidance.

As we pointed out earlier, the shift from childhood to adolescence appears to be associated with an increasing likelihood that firesetting will take place in pairs or groups away from home (Lewis & Yarnell, 1951; Yarnell, 1940) although this does not appear to be the case for females (Lewis & Yarnell, 1951). Thus, for males at least, the social environment outside the home may be an increasingly important factor in firesetting as age increases through adolescence. Yarnell (1940), however, pointed out that the social environment for these adolescent youths was rather limited, since the pairs or groups tended to move together to the exclusion of all other friends. While many activities of adolescents might naturally be expected to take place away from home, the tendency towards peer-group firesetting may also be accentuated by impoverished social environment of the home. In this vein, it should also be noted that some group firesetting has been noted in children (Nurcombe, 1964). Siegelman (1969; Siegelman & Folkman, 1971), in a result at variance with other studies, noted that most firesetting took place outside the home in the presence of other children. In recidivist firesetting children, the mother was sometimes away from the home, working, or the father was absent from the household at the time the fire was set.

In contrast to the literature on children and adolescent firesetters, studies of adult firesetters have provided little specific information on the immediate environment of the arsonist. They have, however, provided a good deal of information on the rearing environments of these firesetters, perhaps because patterns of deviance are generally apparent early in life (cf. Robins, 1966). A consideration of the early environments of adult firesetters will be useful, even though strictly speaking this represents a departure from the topic of this section. The rearing environments look much like those of the younger firesetters: large families of low socioeconomic status, in which one or both parents were absent (Hurley & Monahan, 1969; Inciardi, 1970; Lewis & Yarnell, 1951; Wolford, 1972). Hurley and Monahan (1969) noted a positive correlation between family size and number of arson offenses in a psychiatric prison population, a finding similar to that of Siegelman and Folkman (1971) in children. However, the adult firesetters were more likely to have been first-born, last-born, or only children in their families rather than middle children.

When the immediate environments of adult firesetters have been described, they have generally been seen as unstable. Most studies have shown adult firesetters to have few marital ties and poor employment records (Hurley & Monahan, 1969; Inciardi, 1970; Lewis & Yarnell, 1951), although females are more likely to be married than males (Lewis & Yarnell, 1951). Inciardi (1970) described arsonists in general as leading "a nomadic way of life." Hurley and Monahan (1969) found most arsonists in their sample to be social isolates. In the samples which have been studied, adult firesetting has been a predominantly solitary act (Hurley & Monahan, 1969; Lewis & Yarnell, 1951), in contrast to the relatively more frequent group firesetting in adolescents.

Whether arson is basically an urban or rural crime is difficult to answer. Wolford (1972) found arsonists in prisons in three southern states to have come mainly from rural areas and small towns rather than from larger cities. In studies in England (Hurley & Monahan, 1968; Soothill & Pope, 1973), on the other hand, arsonists came primarily from urban backgrounds. Sample biases are likely to be critical here. Moll (1974) provided evidence that, for the United States as a whole, per capita rates of incendiary fires were highest for central cities.

One area of research which has not received a great deal of attention is the extent to which antecedent environmental conditions are relatively enduring or are transient situational conditions. Siegelman (1969; Siegelman & Folkman, 1971) reported that recidivist firesetters resided in chronically disturbed environments, while the environmental disturbance was more likely to be transient for non-recidivist firesetters. Beyond this finding, nothing systematic has been done to determine the relative importance of transient situational variables in firesetting. The notion that a fire has been set for revenge implies that some event, either real or imaginary, has closely preceded the firesetting. Something like a revenge motive has even been noted for so-called pyromaniacs (Lewis & Yarnell, 1951). In studies of firesetting children, sometimes the father has been absent from the family for years, and other times firesetting closely follows after the father has left. In most cases of firesetting, there are probably recent events which influence the firesetting act. It is important that future research examine these events more systematically and carefully.

ORGANISMIC VARIABLES

Earlier we listed a number of factors which the individual brings into any situation, and which may be related to firesetting. In this section we consider the literature's treatment of these factors in five major areas: sexual problems of firesetters, enuresis and firesetting, firesetting and other deviant behavior patterns, genetic, physiological, and physical abnormalities, and intellectual and academic performance of firesetters. The first two areas--the relationship between sexual problems and enuresis and firesetting--receive special attention because of their historical importance in the literature, and we consider the merits of earlier arguments that sexual behavior and enuresis are related to firesetting. The section on other deviant behavior patterns shown by firesetters emphasizes the more general nature of behavioral disturbances shown by firesetters. The final two sections focus on abnormalities that have a specific biological basis and abnormalities characterized by intellectual or educational deficit respectively.

Firesetting and Sexual Problems

Firesetting has often been considered to be a sexually motivated activity (Lewis, 1965; Robbins, Herman, & Robbins, 1963), perhaps largely because of the historical association of fire with sexual passion (cf. Lewis & Yarnell, 1951). The connection between sex and fire has also played a large role in myths concerning the origin of fire and man's control of fire (Frazer, 1930; Grinstein, 1952; Lewis & Yarnell, 1951). Freud (1932) conjectured that "in order to possess himself of fire, it was necessary for man to renounce the homosexually-tinged desire to extinguish it by a stream of urine" (p. 405). Urinating, especially to extinguish fires, is seen as erotic, and the creation of fires is seen as symbolic of sexual activity. This is a rather brief summary of the psychoanalytic view of firesetting. A logical outcome of this view is that firesetting should be most likely to occur when natural outlets of strong sexual impulses are thwarted. Stekel (1924a), for example, pointed to the relatively young age of most firesetters as indicative of "how strongly the awakening and ungratified sexuality impels the individual to seek a symbolic solution of his conflict between instinct and reality" (p. 125). Simmel (1949), in an analysis of a 21-year-old firesetter, saw firesetting as the result of repressed masturbatory impulses. Gold (1962) emphasized that firesetting can be either the result of repressed (and thus unconscious) sexual impulses or a primary sexual excitant.

The extent to which this approach is or is not supported by empirical evidence will be considered later. It is important, however, that the psychoanalytic view has stimulated inquiry into the relationship between sexual behavior and firesetting. Lewis and Yarnell (1951) reported that 15-20% of adult firesetters in their sample had some record of sexual delinquency, although there was no control group with which to compare these figures. McKerracher and Dacre (1966) studied male arsonists and non-arsonists in a special security hospital, and found that 30% of the arsonists had committed sexual offenses, compared with 56% of the non-arsonists. They also divided the sexual offenses into violent and non-violent acts. Only 11% of the arsonists' sexual offenses were considered violent, while half the sexual offenses of non-arsonists were considered violent. Hurley and Monahan (1969), in a study of psychiatric prisoners, found no difference between male arsonists and non-arsonists in the number of previous sexual offenses. More than half the prisoners also had specific sexual difficulties, although arsonists and non-arsonists did not differ significantly in this regard. Both arsonists and non-arsonists alike tended to express difficulties in social relationships with women. Soothill and Pope (1973) provided evidence that sexual offenses, along with other offenses, may be less frequent for arsonists in general than for arsonists residing in the psychiatric prisons. They studied all the people convicted of arson in England in 1951. Only 3% of convicted arsonists in that year had previous convictions for sexual offenses, and during a 2-year follow-up, only 4% were convicted of sexual offenses. These figures are far lower than for a control group of arsonists in a psychiatric prison.

Thus male arsonists, if anything, show lower rates of sexual offenses than non-arsonists, at least in psychiatric populations. The one study on female arsonists in a psychiatric population, on the other hand, shows just the opposite result. Tennent et al. (1971) found that female arsonists generally had more problems related to sexuality than did a control group of non-arsonists. About a third of the arsonists had previous convictions for prostitution, while non-arsonists had none. In addition, arsonists were

considerably more likely to be considered promiscuous than the non-arsonists, and they reported having their first sexual experience at a younger age (mean = 15.2 years) than did non-arsonists (mean = 20.1 years). While the results for female arsonists appear to be quite different from those for male samples, it is also true that the nature of the sexual behavior in these studies is likely to be quite different from that of the males, so that the findings may not be comparable. Moreover, the terms "promiscuous" and "sexual experience" were not well defined.

Enuresis and Firesetting

In general, the overtly sexual nature of firesetting has not been emphasized in children, although sexual conflicts have sometimes been considered important in firesetting adolescents (cf. Yarnell, 1940). Freud's (1932) conjectures about the urethral-erotic component in the acquisition of power over fire have, however, stimulated research into the relationship between enuresis and firesetting in children. Kaufman, Heims, and Reiser (1961) and Nurcombe (1964) found slightly less than half of their firesetting subjects to be enuretic, while studies by Yarnell (1940) and Vandersall and Wiener (1970) showed the incidence of enuresis to be 15% and 20%, respectively. Lewis and Yarnell (1951), in their study of 238 firesetting children between the ages of 5 and 16 years, reported enuresis in only 9%. In a somewhat different analysis, Michaels and Steinberg (1952) found a higher rate of arson among enuretic delinquents than among non-enuretic delinquents. A recalculation of their data, however, reveals that in their relatively small sample of firesetters, the incidence of enuresis was within the range reported by the above studies. They also suggested that arson was more likely to be a recurring symptom in the enuretic group. This finding is at variance with the results of Siegelman (1969; Siegelman & Folkman, 1971), who found that 16% of recidivist firesetters had been enuretic beyond 6 years of age, while the figure was 30% for non-recidivists.

What the studies on firesetting in children have ignored is the apparently high rate of enuresis in the population in general and in other selected populations. Michaels and Goodman (1934) found that 24.7% of children in a recreational camp had a history of enuresis. Bakwin and Bakwin (1960) found that 26% of unselected hospital outpatient children, 4-12 years of age, wet themselves during the day or night, or both. A similar figure was reported by Oppel, Harper, and Rider (1968) who conducted a 12-year longitudinal study of 992 children born in Baltimore in 1952. Michaels and Steinberg (1952) found a comparably high rate of histories of enuresis in their study as well as in other studies. They further noted, however, that enuresis appears to persist for a longer period of time in delinquent than in non-delinquent populations. The persistence of enuresis has not been systematically examined in samples of firesetting children. While a more detailed analysis of enuresis and its association with other delinquent, psychiatric, neurological, and familial factors is beyond the scope of this paper, we may conclude that the data do not at this time support the conclusion that there is any special relationship between enuresis and firesetting.

Firesetting and Other Associated Patterns of Deviance

The extent to which firesetting appears to be only one of several delinquent behaviors which firesetting children may display has been covered in detail elsewhere, and need not be repeated here. The same holds true for

adult firesetters, at least in those who have been apprehended. Alcoholism, poor occupational and marital adjustment, and social isolation have been frequently mentioned as indicators of the broad spectrum of problems which firesetters display (Hurley & Monahan, 1969; Inciardi, 1970; Lewis & Yarnell, 1951). Similar patterns of deviance have been found when personality measures were taken among arsonists in criminal psychiatric hospitals and prisons (Hurley & Monahan, 1969; Tennent et al., 1971; Wolford, 1972). With few exceptions, however, personality measures have shown a great deal of commonality between arsonists and other types of criminals. Wolford (1972), for example, compared incarcerated arsonists and non-arsonists on a number of demographic, criminological, and sociological variables. Except for what appeared to be some differences in their reaction to the prison environment, Wolford concluded that the arsonists and non-arsonists appeared to be very similar.

Virtually all prison and hospital studies have reported that both arsonists and non-arsonists as a group show extensive histories of criminal and anti-social behavior. However, the types of antisocial behavior shown by the two groups is perhaps the most striking distinguishing characteristic. A very consistent finding in the literature is that arsonists had previously com-mitted a significantly greater number of crimes against property (other than arson) and fewer crimes against persons than had non-arsonist criminals (Hurley & Monahan, 1969; McKerracher & Dacre, 1966; Tennent et al., 1971; Wolford, 1972). This finding has shifted the focus somewhat away from the sexual explanations of firesetting and toward an explanation of firesetting as displaced aggression, when aggressive impulses are thwarted (McKerracher & Dacre, 1966; Tennent et al., 1971). McKerracher & Dacre found their male arsonists to be more suicidal than non-arsonists, and Tennent et al. found female arsonists in their study to be more depressed than non-arsonists. Both of these findings have been cited as further evidence that firesetters have difficulty in externalizing aggression. In a similar vein, Lewis and Yarnell (1951), although generally espousing the sexual explanation of firesetting, also suggested the possibility that firesetting may result from fear of aggression towards others, being attacked by others, or the inability to effectively attack or fight back. The data on previous sexual offenses reported by McKerracher and Dacre (1966) are very interesting in regard to the displaced aggression hypothesis: Although both arsonists and non-arsonists were equally likely to have committed previous sexual offenses, the sexual offenses of non-arsonists were far more likely to have been aggressive.

While the previous discussion has centered around studies conducted in hospitals and prisons, the findings may nevertheless have somewhat greater applicability. Soothill and Pope (1973) conducted a 20-year follow-up study of 67 people convicted of arson in England in 1951, representing about 90% of the total number convicted during that year. The remaining records could not be traced. The findings concerning property-related crimes and aggressive crimes were substantially the same as in the institutional studies, except that the overall percentage of criminal offenses was lower than for a com-parison group of arsonists in a criminal psychiatric facility. Nevertheless, 57% of these offenders had previous convictions, while 52% were convicted of offenses in the 20 years subsequent to their arson conviction. In both previous and subsequent convictions, offenses were mainly property-related, and only three of the 67 individuals were convicted for subsequent arson offenses. These results are certainly supportive of the findings in hospitals and prisons, although they should be treated with some caution, since there was no comparison group of people convicted of other crimes in 1951, and

since the cohort represented only those individuals apprehended and convicted of setting incendiary fires in that year.

These findings should not be construed as suggesting that arsonists are not violent or aggressive. Rather they suggest that, as a group, the arsonists for whom we have data are less likely to have exhibited aggressive criminal behavior than are criminals who have committed other types of crimes. It is likely that, as a group, arsonists tend to be aggressive at a higher rate than the population as a whole, although this is not unquestionably the case either. These notions invite a detailed comparison between a group of arsonists, a group of non-arsonists who have committed other crimes, and a control group matched for various familial, socioeconomic, demographic, and age variables. Such a study might yield results similar to those which Patterson (1978), replicating an earlier study by Reid and Hendricks (1973), found in children. Children identified as stealers employed coercive behaviors at a rate higher than that for matched normal children but at a lower rate than children identified as socially aggressive. Patterson employed the term "stealers" to describe the group which has also been referred to as "delinquent" in other studies which he reviewed, because that appeared to be a salient feature of children in that group. From his review of the literature and from his own data, Patterson identified these two major categories—socially aggressive and delinquent—into which children with conduct problems fall. In Patterson's studies, firesetting children appeared to fall into the latter category. It may be that adult firesetters fall into an analogous category. Although firesetting children in most of the studies reviewed in this paper were identified as aggressive, it is also possible that appropriate comparison groups would yield similar results to those of Patterson.

An alternative hypothesis is that there is a small group of firesetters who are aggressive, and that this group might show a number of characteristics which distinguish it from firesetters who tend to be less aggressive. Such a group might not have been picked up in Patterson's (1978) small (n = 12) sample. There is little information in the literature to test this notion, since virtually all studies have presented statistical data for groups of firesetters as a whole, rather than attempting to identify clusters of behavioral symptoms which distinguish types of firesetters. The closest example of this approach was provided by Siegelman (1969; Siegelman & Folkman, 1971), in distinguishing between angry, impulsive firesetters and withdrawn firesetters, but again the sample was small and the typology was considered preliminary. On the other hand, several studies of violence have implicated firesetting as an associated factor. For example, a triad in childhood of enuresis, firesetting, and cruelty to animals has been considered by some as predictive of adult violent crime (Hellman & Blackman, 1966; MacDonald, 1968; Wax & Haddox, 1974a,b). Both Kaufman (1962) and Bender (1959) have found firesetting to be a frequent behavior problem in violent children. Bender's (1959) findings concerning children and adolescents who have killed are especially interesting in this regard. She considered all six deaths caused by children's firesetting activities to be unintentional. A number of children who caused death by some other means than fire were also considered compulsive firesetters, including all five who were associated with a drowning death. In discussing this group, Bender noted that because of the nature of this type of death, it was impossible for her to determine accurately whether the death was an intentional act. However, one child was associated with two separate drowning incidents, all subsequently threatened to kill, and two subsequently committed aggressive crimes. These results, while hardly

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definitive, suggest the need for further study of aggression in firesetting children, with particular emphasis on the search for clusters of behavioral correlates.

Genetic, Physiological, and Physical Abnormalities

Several studies have noted cases in which firesetting has been associated with various genetic, physiological, and physical abnormalities. However, the mechanisms associating these abnormalities with firesetting and other criminal activities are not well understood, and the studies generally represent selected cases or samples. A number of studies have found arson to be a frequent occurrence among samples of individuals with chromosomal abnormalities (Bartlett, Hurley, Brand, & Poole, 1968; Nielsen, 1970; Nielsen, Stürup, Tsuboi, & Romano, 1969; Nielsen, Tsuboi, Turner, Jensen, & Sachs, 1969). In the studies by Nielsen et al., many of the cases involved Klinefelter's syndrome, which is associated with physical as well as chromosomal abnormalities. Hurley & Monahan (1969) noted that three patients in their arsonist sample showed chromosomal abnormalities out of 14 who had been screened for such abnormalities; included was one case of Klinefelter's syndrome. Two other patients also had abnormal body builds, and all three cases involving abnormal physique considered this a grave social handicap. Two other cases, one involving Bell's palsy and the other a congenital strabismus, were described as showing a hysterical over-reaction to their disabilities.

Hurley and Monahan (1969) also found an excess of slow waves in the resting E.E.G. record in a high percentage of their cases, a finding to which they were unable to attach any particular significance. None of their cases was epileptic and they observed no epileptiform E.E.G. patterns. Kido (1970), however, studying a group consisting of six murderers and one arsonist, found a low threshold for epileptic seizure discharges when seizure-inducing drugs were administered. He later (Kido, 1973) related these low thresholds for drug-induced seizures to recidivism and murder in a larger adolescent delinquent sample. Kido believed that these low thresholds may represent a biological predisposition to criminal activity, and in particular a manifestation of the fighting instinct and aggressive drive. However, this is a speculative proposition, and at any rate its significance in relation to firesetting is unclear.

It is probably easier to interpret the social significance of physical abnormalities as contributing factors to firesetting as well as to other criminal behavior. It is likely that physical defects will affect the social behavior of other people toward the individual, and in turn the social behavior of the individual toward others. In addition to the previously mentioned studies, Lewis and Yarnell (1951) noted a high incidence of physical abnormalities in their sample. The effects of physical abnormalities on social behavior is probably no better exemplified than in a case study by Woolf (1977), who examined the history of an arsonist who was suffering from Moebius syndrome, also known as congenital facial diplegia. One of the major disabilities associated with this syndrome is a complete bilateral paralysis of the facial nerves, so that the affected individual is unable to show facial expressions, and eye movements are severely limited. In the case reported by Woolf, a 22-year-old male had apparently done fairly well for the first 20 years of his life when, ironically, he encountered extreme social rejection by fellow employees of a hospital where he had recently begun work. He set several small fires in a laundry room in the nurses' home where he lived along with a number of young women with whom he was unable to make social headway.

The preceding examples suggest that physical abnormalities, while not likely to directly predispose an individual to criminal activity, may be a factor in producing a stressful environment which sets the occasion for activities such as firesetting. In other cases, certain physical difficulties, such as the high incidence of allergies and respiratory problems noted by Siegelman (1969; Siegelman & Folkman, 1971), may be exacerbated by environmental stresses. In general, our knowledge of the physical problems of firesetters is limited mainly to the passing reference to them in the literature, and mainly as a further demonstration of the kinds of stressful situations in which firesetters find themselves. We know very little about how the physical problems of firesetters compare to those of the general population.

Intellectual and Academic Performance of Firesetters

A number of authors have examined the intellectual and academic performance of firesetters. Lewis and Yarnell (1951) reported that 48% of their adult male sample could be classified by IQ as "mentally defective." Only 17% could be classified as of average to superior intelligence. The rest ranged from borderline to low average intelligence. Wolford (1972) found both the educational level and IQ scores of arsonists to be significantly lower than those of non-arsonists in a sample of prisoners. In neither of these studies were the testing instruments specified. Lewis and Yarnell relied on whatever data were available from case histories, and this was probably the case in the Wolford study as well. Hurley and Monahan (1969) reported data for arsonists on the Raven Progressive Matrices, a test of non-verbal intelligence. The arsonists generally fell within the normal range of intelligence on this test.

Among females, Lewis and Yarnell found an even higher rate of mental deficiency (68%) than for males. Tennent et al. (1971) reported results on the Wechsler Adult Intelligence Scale (WAIS), which had been administered to female arsonists and non-arsonist controls in special hospitals. Mean scores on the WAIS did not differ for arsonists or controls, although both groups scored well below average for the population as a whole. The proportion of arsonists diagnosed as intellectually subnormal, while higher than would be expected in the normal population, was not as high as Lewis and Yarnell found in their sample of female arsonists.

Lewis and Yarnell (1951), reporting on their sample of children, concluded that defective intelligence was not a significant factor in firesetters under 16 years of age, although borderline intellectual deficiency became important between 10 and 11 years, when some of the children began to set revenge fires in school. Nurcombe (1964), in his study of 21 firesetting children, found two of above average intelligence, 10 of average intelligence, five classified as "dull," and four considered borderline. None were considered mentally retarded. Again, specific tests were not identified. Kaufman, Heims, and Reiser (1961) found over 70% of firesetting children and adolescents in their study to be retarded by one or more grade levels. Vandersall and Wiener (1970) reported 60% of the children in their study to be experiencing academic difficulties. Both of these findings are substantially in agreement with the later findings of Siegelman (1969; Siegelman & Folkman, 1971). Vandersall and Wiener further reported that for the 10 children for whom psychometric data were available, the average IQ was 87. However, they were careful to point out that this figure is probably lower than for the group as a whole, since IQ testing was usually performed

selectively on those clients already suspected of being intellectually below average. Kafry (1978), in her study of children in the general population, found little difference in intellectual performance between children who had set fires, those who played with matches, and those who neither set fires nor played with matches.

The data concerning intellectual and academic performance of firesetters do not permit any clear-cut conclusions. Among studies of adults, none report an incidence of intellectual retardation which approaches that found by Lewis and Yarnell (1951). There is certainly a need for more complete recording of intellectual and educational data. Wolford's (1972) data showing the educational level of adult arsonists to be lower than that of non-arsonists are consistent with the findings of academic difficulties of children who set fires. However, there is little support in the literature that firesetting children differ from normal children in intellectual test performance. Where marked intellectual deficiencies are noted in both adults and children, they may often be due to the biases with which these samples are chosen: Those who are least capable of avoiding detection are the most likely to find their way into psychiatric hospitals and prisons. Even among fires set by children, the proportion reported to the authorities is very low (Kafry, 1978), so that clinical studies of firesetting children may be unrepresentative of the population. Where firesetters are shown to perform somewhat lower than average on intellectual tests, such findings do not necessarily indicate a relationship between intelligence and some specific predisposition to set fires. Intellectual and academic difficulties are likely to be a result of, as well as a cause of, environmental stress. Shinn's (1978) review of the relationship between intellectual development and father-absence is relevant to this point. The families of firesetting children and the family histories of firesetting adults suggest that many firesetters are members of a subgroup of father-absent children. Shinn concluded that the lower intellectual performance of father-absent children is likely due to anxiety and a general lack of parental attention.

In this rather lengthy discussion of what we have referred to as organismic variables, a number of factors which appear to characterize firesetters have been identified. What seems to be lacking is any conceptualization about how these factors interact and which, if any, are critical. The fact that data have generally been presented in terms of the percentage of firesetters exhibiting a given characteristic suggests that, not surprisingly, not all important characteristics are shared by all firesetters. If we are to be able to identify more clearly some of the common features among various groups of firesetters, and to perhaps suggest some critically important variables involved in firesetting behavior, it will be important that we identify common behavioral clusters, and this not only involves relating various individual characteristics to firesetting, but to each other as well. This is a point that has been raised a number of times thus far, and will continue to be raised in future sections of this paper.

FIRESETTING BEHAVIOR

As a whole, the literature has not given as systematic or detailed an analysis of actual firesetting behavior and the consequences of firesetting as it has the antecedent conditions and organismic variables. However, what firesetters actually do, and what consequences in the environment serve to maintain that behavior may be very significant aspects of the firesetting act,

a fact which was well recognized by Macht and Mack (1968). The behavioral components might include, but not necessarily be limited to, the following: the planning and timing of the act, the objects or structures set on fire, accelerants employed, whether the firesetting represents a single or repetitious act, whether it is performed alone, in the presence of others, or in association with others, and behavior after the fire is set.

Some of these behavioral components seem to relate to the types of firesetters described by Lewis and Yarnell (1951). For example, many of the firesetters described as jealousy-motivated set fire to the beds or clothing of their estranged lovers. Revenge-motivated firesetters frequently were farm hands who set fire to their employers' barns. Those described as "pyromaniacs" often set multiple fires to certain types of objects, such as abandoned buildings or trash bins, often using what materials were available for fire building. Warner (1932) described a case of multiple firesetting in which the only target appeared to be baby carriages. Targets have not always been this specific, and multiple firesetting has not been a unique characteristic of those described as pyromaniacs. Lewis and Yarnell (1951), for example, noted that about 40% of revenge-motivated firesetters had set more than one fire, with the intervals between fires ranging from hours to months. One of the variables influencing the number of fires set, of course, is whether or not the firesetter is apprehended.

Other aspects of fire targets which may be important are the ownership of the target (target owned by firesetter, owned by relative or acquaintance of the firesetter, or by someone unknown to the firesetter) and whether the structure was inhabited or occupied by other people. In the study by Hurley and Monahan (1969), ownership of the property burned by psychiatric hospital prisoners was distributed over a wide variety of people known to the offenders, including parents and relatives, wives and girlfriends, employers, landlords, and the like. However, nearly 40% of the offenses were fires to property whose owner was not known to the arsonists. On the other hand, both Tennent et al. (1971) and Lewis and Yarnell (1951) found that female arsonists set fire primarily to their own property, a finding which was considered indicative of the self-destructive nature of this group.

Data on whether structures were occupied at the time of the fire are scarce, although numerous studies reviewed in this paper have presented this information in specific case examples. Soothill and Pope (1973) and Hurley and Monahan (1969) presented data on types of structures burned, and some of the categories included structures less likely to be occupied than others. Soothill and Pope found haystacks to be the most frequent target of arsonists convicted in England in 1951, covering 32% of the cases; the rest were divided mainly between dwelling houses and outbuildings (sheds, garages, and barns). Hurley and Monahan (1969), on the other hand, found that commercial property had been the most frequent target of psychiatric prisoners, with dwelling houses second, and with haystacks and barns occupying a somewhat smaller proportion. Virkkunen (1974) addressed directly the question of structure occupancy in his comparison of schizophrenic and non-schizophrenic arsonists. He found that schizophrenics were far more likely to have set fire in a place where there were not even temporary lodgers, and thus far less likely to have set fire to potentially occupied dwellings, than were non-schizophrenic arsonists.

The foregoing examples suggest that an analysis of firesetting targets may provide significant information, especially when considered with other factors which contribute to the firesetting act. Also important are behaviors which occur before, during, and after the fire. For example,

whether or not the firesetter stays to watch the fire, turns in an alarm, or helps to put out the fire are important indicators of social rewards which may be maintaining firesetting. A similar statement may be made about whether firesetting occurs alone or in groups. Lewis and Yarnell (1951) considered these factors important in determining certain classes of fire-setters, and they will be discussed in the next section.

Another important consideration is behavior which occurs close enough in proximity to be considered part of the firesetting act. For example, a number of studies have reported that a large proportion of firesetters have been intoxicated with alcohol at the time of the firesetting (Hurley & Monahan, 1969; Inciardi, 1970; Lewis & Yarnell, 1951). Although alcoholism was considered in the section on organismic variables, it is also true that drinking immediately prior to firesetting may in fact be an important com-ponent of the behavior. Lewis and Yarnell (1951) stated that, although they believed that the same factors which led to firesetting also contributed to excessive drinking, alcohol consumption may have also reduced inhibitions which may have otherwise prohibited firesetting.

Violent behavior may accompany firesetting, and its consideration may help to clarify the relationship between firesetting and aggression. Lewis and Yarnell (1951) noted several cases in which the arsonist had committed an assault prior to setting the fire. Nagae (1974) investigated a number of cases which he called murder-arson. He considered it important to dis-tinguish whether the murder had been committed prior to arson, after the arson, or whether the arson was the instrument of murder.

The preceding discussion has centered on firesetting behavior in adults. The approach to firesetting behavior of children would be similar although, of course, the findings might be somewhat different. Studies of firesetting in children have generally provided very little information about actual firesetting behavior, with available information yielding inconsistent find-ings. Yarnell (1940) reported that children usually accumulated matches, candles, and paper, and although they liked to make fires in streets and vacant lots, they eventually made a fire in their home. Yarnell found that most fires were set in the home and immediate vicinity, and the children usually extinguished the fires themselves. Although she reported that young adolescents often set fires in groups, she made no mention of group fire-setting in children. Siegelman (1969), on the other hand, reported that children's fires were set mainly away from home, and in the presence of other children. In neither of these studies were data reported supporting these conclusions.

Nurcombe (1964), in his study of 21 firesetting children, reported that 13 of the children set fires solely at home, seven set fires both at home and away, and only one did so exclusively away from home. Twelve children set fires alone, six did so either alone or in a group, and three set fires only in groups. Thus, in Nurcombe's sample, it could be said that the children set their fires mainly at home and alone, although this was not exclusively the case.

Kafry (1978) reported some rather remarkable findings concerning fire-setting behavior in her sample of 99 school children. Forty-five percent of the children had played with matches, and 47% of these had set fires, representing 21% of the total sample. All of the fires were set by children who played with matches, including one which caused serious damage to a house and ten which caused damage to household items. Rather than distin-guishing between whether fires occurred mainly at home or away, Kafry stated

that fires occurred mainly in places where they could not easily be detected by adults, which included a yard or field (39%) and in other places such as under a bed or in a closet, bathroom, tool shed, garage, or basement (52%). Fifty-two percent of the fires were set in the presence of other children or siblings. Almost half of the fires were extinguished with the aid of an adult, and one fire was extinguished by the fire department, a finding somewhat different from that of Yarnell (1940).

In addition to the remarkably high incidence of firesetting in an otherwise unselected sample of children, the study by Kafry (1978) points to fire play as the most important behavioral component in firesetting. A third of the fires resulted from a single instance of fire play, but 81% of the children who repeatedly played with matches had set a fire. These findings suggest that firesetting is not an infrequent behavior in children, and that it is a result of fire play, with the probability of firesetting increasing with an increasing incidence of fire play. This analysis of childhood firesetting is somewhat different from that presented by other authors, notably Kaufman, Heims, and Reiser (1962), who saw firesetting as indicative of a serious psychiatric disorder. Much of this difference may be accounted for by the fact that the children in the Kaufman et al. study represented a highly selected sample. For Kafry, an analysis of the factors associated with firesetting involves an analysis of the factors associated with fire play. In terms of the organismic variables and antecedent conditions, these were similar to those described for firesetting children in other studies. Kafry went further and suggested how the manner in which parents train their children in fire use and channel their natural curiosity about fire might have influenced children's hazardous fire play. This topic will be covered later in a discussion of prevention and treatment strategies.

CONSEQUENCES OF FIRESETTING

Certainly the wealth of data collected from human and animal studies over the past several decades have confirmed that behavior is to a great extent controlled by its consequences, and we would expect firesetting behavior to be no different in this regard. Some of the consequences of firesetting which might be expected to act as rewards--or reinforcing stimuli-- for firesetting behavior are the warmth and visual stimulation provided by the fire itself, the confusion and excitement created by the fire, recognition and praise from the community for turning in an alarm or helping to put out the fire, and possible economic gains. When fires are set in groups, as is apparently often the case with adolescents and sometimes with children and adults as well, social recognition from peers would also seem to be important.

These are the obvious sorts of rewards, and indeed they have often been the basis for determining certain classes of firesetters described by Lewis and Yarnell (1951): would-be heroes, volunteer firemen who set fires, fire "buffs," pyromaniacs, and the like. Sometimes, however, consequences are more subtle and are discovered through careful reconstruction of events. Macht and Mack (1968) reported the case of a female firesetter who set several grass fires, turned in alarms, and watched the firemen put them out. She apparently told her mother of the fires in hopes that she would be hospitalized, but her mother did not believe her. Two days later she set a fire to her coat sleeve, and thereafter she was hospitalized. It may have

been that firesetting functioned to remove her from an aversive situation.
In many cases, the social attention derived from firesetting need not be in
the form of praise or other positive recognition, but negative social
attention may also be an important factor. Lewis and Yarnell (1951)
reported that a number of firesetters, especially those with lower intel-
lectual abilities, would also admit to setting fires they had not actually
set, apparently because of the attention they derived from these admissions.
Lewis and Yarnell also noticed that once they were apprehended and confined,
firesetters often ceased their firesetting activities and became rather
docile. Gunderson (1974) reported that manic patients in hospitals often
set fires if severe limits were not placed on their activities. Gunderson
suggested that the patients "seemed to be demanding an omnipotent authori-
tarian parent" (Gunderson, 1974, p. 145). More precisely, the setting of
limits might give the firesetter an opportunity to test those limits and
receive the attention derived from the interactions. In many cases where
conditions are aversive or where the individual is socially deprived,
attention, even if negative, may be rewarding. This may especially be the
case with some children from disturbed family situations, where by setting
fires, the child may be cutting his piece of the social pie.

Two related points need to be made in regard to the consequences of
firesetting. The first is that the possible consequences maintaining fire-
setting behavior are often inferred from the behavior. In this sense, the
behavior and the consequences it produces represent a unit. For example, in
order to receive community praise and recognition, a firesetter must remain
at the scene and turn in an alarm or help fight the fire. The behavior and
its consequences are rather specific to one another. Thus, we often draw
inferences about what consequences might be maintaining behavior from the
behavior itself. Secondly, strictly speaking, to say that a particular con-
sequence is rewarding or reinforcing demands a demonstration that the
consequence influences the future occurrence of the behavior in question.
While in some cases of multiple firesettings such a demonstration might be
possible, it certainly is not possible in cases of only a single instance of
firesetting in an individual. However, it is useful to point out that we
are here using a somewhat expanded conceptualization of rewarding or rein-
forcing consequences. An individual may learn of the probable consequences
of his actions by vicarious means, as suggested by social learning theorists
such as Bandura (1976). In addition, firesetting may represent one response
in a pattern of behaviors that the individual has used in the past which have
resulted in rewarding consequences. For example, Lewis and Yarnell (1951)
reported that firesetters who were "fire buffs" or who wanted to see fire
engines also had histories of turning in false alarms. A similar statement
might be made concerning the earlier example of firesetters who also falsely
admit to setting other fires. They are likely to show a general pattern of
attention-getting behavior. Thus, our understanding of the consequences of
firesetting for an individual is likely to contribute to a more general
understanding of deviant behavior patterns for that individual, and vice
versa.

THEORETICAL ISSUES

As we stated at the outset, classification systems will both reflect
and shape the distinctions which researchers make as they plan new studies
and modify current theories. Our greatest criticism of previous attempts at

classification of firesetters is that they have contributed little to a coherent understanding of firesetting. This problem is due in part to the classification systems themselves. Traditional classification systems appear to have arisen from legal considerations and folk wisdom rather than any specific psychological theory. While psychoanalysts have attempted to give categories like pyromania theoretical substance they have met with marginal success at best. In the previous section we attempted an alternative account by organizing the possible factors involved in firesetting into the four major categories of antecedent conditions, organismic variables, firesetting behavior, and consequences of firesetting. These four categories were chosen because they lead to an understanding of firesetting in terms of social learning theory, an approach that emphasizes the importance of the interaction between individuals and their natural environment in determining behavior.

In this section we will briefly consider both the psychoanalytic and social learning approaches to the understanding of firesetting. The major implications of each theory for the study of firesetting will be explored.

Psychoanalytic explanations of firesetting have predominated in the literature, perhaps because this approach has long been a major force in the field of psychiatry. It is also true that psychoanalytic thinking relies heavily on an analysis of the symbolic nature of behavior, and fire has played such an important role in the development of civilization that myths of its origin have appeared in nearly every culture (cf. Frazer, 1930; Freud, 1932; Grinstein, 1952). It is often employed both as a symbolic outlet for sexual passion and for extremely destructive impulses (Axberger, 1973; Grinstein, 1952; Lewis & Yarnell, 1951; Topp, 1973). It is perhaps reasonable, then, that many theorists should have so readily embraced the notion that firesetting is symbolic of sexual activity, and that it is a result of repressed sexual impulses, or that it sometimes occurs during periods of self-enforced sexual abstinence (Gold, 1962; Lewis, 1965; Robbins, Herman, & Robbins, 1963; Simmel, 1949; Stekel, 1924a,b).

One difficulty with the psychoanalytic explanation of firesetting is a lack of empirical support. In the section on organismic variables, we concluded that neither the data on sexual behavior nor the enuresis data supported the conclusion that there was any special relationship between firesetting and sexual deviance, or that firesetting could be considered a urethral-erotic trait. These conclusions question some of the underpinnings of the psychoanalytic approach, but they do not attack directly the notion that sexual conflicts are at the root of firesetting behavior. Indeed, a number of studies of specific cases seem to associate sexual conflict with firesetting (Finkelstein, 1968; Gold, 1962; Lewis & Yarnell, 1951; Simmel, 1949; Stekel, 1924a,b). However, there is a further difficulty here in that sexual conflicts are so pervasive in our society that surely the incidence of sexual conflicts must far outstrip the incidence of firesetting. Gold, himself a psychoanalyst, perhaps stated the argument most elegantly:

> Quite obviously, it isn't sexual tension alone which has become blocked from normal release that draws people to set fires. If this were the case no city would be left standing. (Gold, 1962, p. 407)

He found it necessary to postulate some as yet unspecified mechanism involving "an unusual type of release of energy potentials along specific neural circuits which have been conditioned and imprinted earlier in the life of the individual by abnormal experiences, both general and sexual" (p. 407).

This emphasis on early abnormal or traumatic sexual experiences as determinants of later deviant behavior is shared by many psychoanalytic theorists. These experiences are thought to be repressed in the unconscious, and are routinely uncovered during therapy. However, as Wachtel (1977) has observed, it is sometimes more meaningful to turn the relationship around: The remembrance of early experiences, either real or imagined, may be a result of, rather than a determinant of, an individual's current distress. If this notion is accepted, then it is possible to examine the sexual symbolism and content of firesetting and their meaning to the individual without having to assume that sexual conflicts are the major determinant of firesetting. Rather, sexual difficulties are likely to be only one facet of a myriad of difficulties which beset the firesetter.

Firesetting, associated antisocial behaviors, sexual, marital and occupational maladjustment, and alcoholism can all be considered parallel indicators of a general lack of self-control, self-confidence, and the skills, particularly social skills, necessary to obtain rewards from the environment in an appropriate manner. Certainly the available data appear to support this picture of the "typical" adult firesetters who have been studied. Most of these firesetters have grown up in environments which are not likely to support normal social development; they typically have not fared well in school; and by the time they are adolescents or young adults they have usually experienced a great deal of failure in activities which society deems important.

Since a great many people undoubtedly experience a similar development, it is appropriate to ask: Why does the firesetter choose fire? One answer, of course, is that firesetting is only one behavior among many maladaptive behaviors seen in these individuals. In fact, it might be said that the major difference between firesetters and other criminals is that firesetters set fires. But beyond that trite statement, two major reasons for firesetting may be stated.

First, firesetting offers immediate consequences which may be rewarding to the individual. These include the sensory stimulation of the fire itself, the commotion of crowds, sirens and bells, and praise and recognition derived from the community if the firesetter turns in the alarm or helps put out the fire.

Second, an avoidance mechanism is likely to be involved. If the individual is lacking in self-confidence and has been unsuccessful at interactions with other individuals in the past, then such social interactions are likely to be aversive. When problems with other people arise, he is not likely to solve them in a direct or socially acceptable manner. Instead, he is likely to respond in a destructive way which avoids confrontation with other people. This analysis is supported by the finding that arsonists show a general pattern of offenses against property rather than against other people (Hurley & Monahan, 1969), a finding which has also given rise to the interpretation of arson as an indirect or displaced form of aggression (McKerracher & Dacre, 1966).

The analysis presented here is more or less consistent with a social learning theory of behavior (cf. Bandura, 1976; Patterson, Reid, Jones, & Conger, 1975 for general outlines of this approach). According to social learning theory, behavior develops through the selective action of its consequences in the natural environment. Some responses are rewarded, while others are not or are even punished. The consequences of behavior need not be experienced directly for learning to take place; they may also be

experienced vicariously through observing others perform a behavior, and through pictorial or verbal experiences. These vicarious learning processes are generally referred to as modeling processes. A person may be likely to perform a response which he observes someone else perform; he is even more likely to perform the response if he observes the model being rewarded for that behavior. Several studies provide examples of how experiences with fire may have influenced the behavior of firesetters. Wolford (1972) found that arsonists in his sample of prisoners tended to come from more rural settings than did non-arsonists. It is likely that persons growing up in rural settings were exposed to large fires when land was cleared and trash was burned. Macht and Mack (1968) found that fathers of adolescent firesetters in their sample all had some significant involvement with fire in their employment (fireman, furnace stoker, gas burner repairman, automobile burner at a junkyard). In one case, a son had watched his father set fires to automobiles for one year, and the following year was allowed to help set the fires himself. With this group, both vicarious and actual experiences with fire may have contributed to firesetting. Yarnell (1940) considered the possibility of prior experience with fire as a contributing factor to children's firesetting, but she did not believe that earlier experiences with fire in her sample of child firesetters were much different than those which might be found in normal children.

On the other hand, the data of Kafry (1978) suggest that certain kinds of fire experience, notably unsupervised fire play, may be an important precursor to firesetting. All of the children who had set fires also had played with matches. Moreover, the quality of fire experience may also be important. The children who did not play with matches were not, as a group, inexperienced in the use of fire: About half of the children who did not play with matches were allowed by their parents to strike matches under supervision. Interest in fire is very high in boys, beginning at about 3 years of age (Block, Block, & Folkman, 1976; Nurcombe, 1964). A number of authors have suggested that the manner in which this interest is channelled may be an important determinant of firesetting behavior (Block, Block, & Folkman, 1976; Kafry, 1978; Siegelman, 1969). Early traumatic experiences with fire may have less to do with firesetting behavior than more subtle training and modeling experiences. Furthermore these experiences may have a great influence only when other conditions are favorable.

We have already discussed what some of these conditions favorable to firesetting are likely to be. In general they revolve around an environment which has not been very rewarding. Yet beyond the quality of the immediate external environment, the perceived level of reward may depend largely upon cognitive factors which involve the individual's perceptions and expectations (Bandura, 1976). A thorough analysis of these factors would be beyond the scope of this paper, but some basic principles can be outlined here. The firesetter's general ineffectiveness in obtaining rewards may affect his perception of the relationship between his behavior and its consequences, his evaluation of his performance relative to that of others, and his evaluation of his performance against his own standards. A history of failure may result in an expectancy of failure in new situations. Even is he is successful in producing rewards, the firesetter may be inclined to attribute success to factors beyond his control. In a similar vein, he may see his performance as poor, relative to others and relative to whatever personal standards he may have set for himself, even though such a low self-evaluation may have little basis in reality. This kind of pattern is largely self-perpetuating, and it may persist far beyond the boundaries of the environment

which produced it. The act of firesetting often appears to be far out of proportion to its motive. From the firesetter's point of view, however, that may not be the case. Firesetting may offer a kind of control over the environment which the firesetter has been unable to obtain in other ways.

While Bandura has emphasized many of the cognitive factors involved in deviant behavior, Patterson and his associates (Patterson, 1975, 1978; Patterson, Reid, Jones, & Conger, 1975) have emphasized the importance of reciprocal interactions between deviant children and their social environment. They have found, for example, that "aggressive children are likely to come from families in which all members demonstrate high rates of aggressive behaviors" (Patterson et al., 1975, p. 4). The child learns to exhibit these behaviors through the mechanisms of instinctual responses, modeling, and social consequences, but they tend to self-perpetuate. In his "deviancy drift hypothesis," Patterson (1978) suggests that crucial omissions in the development of social skills may start a chain reaction which results in an adult who will almost certainly fail to cope with the everyday problems of adult life. While the problems may begin within the family, the child is likely to elicit negative reactions from peers and others outside the family environment, and this is likely to lead eventually to difficulties in school and to further social deviancy. Patterson points out that ultimately these deviant children continue to fail at each stage of social development precisely because they have not yet learned the prerequisite social skills, and the process continues to snowball. Thus, this hypothesis suggests that the deviant child is both a victim and creator of his socially deprived environment. In the studies reviewed in this paper, both children and adults who set fires come from family environments which could be expected to start such a sequence of deviant social development. The model is appealing because although the outcomes may be different, similar learning processes operate for both normal and deviant social development, and these processes suggest appropriate intervention strategies.

INTERVENTION STRATEGIES

Relatively little has been written about the treatment of firesetting, although a number of authors have suggested that effective treatment is possible (Lewis & Yarnell, 1951; Schmideberg, 1953; Warner, 1932). Stekel (1924b) presented an extensive account of the psychoanalysis of a firesetter. The approach relied heavily on the analysis of dreams in bringing to light the patient's unconscious motives. Stekel reported the analysis to be incomplete, however, and its effectiveness was not clear. Details of therapy in the previously reviewed studies have not been given. Schmideberg (1953) insisted that it was possible to effectively treat firesetters, but stated that an account of treatment was too detailed to give in her paper. It seems safe to assume, given the heavy emphasis on psychoanalytic accounts of firesetting, that psychoanalytic methods have been heavily employed.

Two studies employed a general psychoanalytic approach in psychiatric hospital settings. Awad and Harrison (1976) reported on the therapy of a 12½-year-old female firesetter. Hospitalization had been recommended largely because of a deteriorating family situation as well as the disturbances shown by the child. In addition to the individual therapy, Awad and Harrison stressed the importance of later involvement of the family in therapy, and in a change in "family style" to prevent recurrence of the firesetting. They

also felt that it was important for the patient to recognize and express anger appropriately, a notion which is consistent with the displaced aggression hypothesis of firesetting. Unfortunately, no follow-up of treatment was reported. Borriello (1973) treated adult patients with acting-out character disorders, including arsonists, in a group psychotherapy approach. Two major reasons for the group approach were that the group represented a reconstructed family unit and that patients were often more likely to accept interpretations from peers than from the therapist. Borriello also stressed "firm, persistent, active-caring involvement" rather than "the more traditional passive-caring type" with these difficult patients. A most important aspect of this study was a 2- to 4-year follow-up of treatment effectiveness. Of 32 patients discharged, Borriello considered 26 to have been effectively treated in terms of resulting "community adjustment, independent support, lack of trouble with the law, and for some, occupational training."

The above approaches to therapy are quite involved and lengthy, and critical variables are sometimes difficult to specify. In the Awad and Harrison (1976) study, for example, the patient was hospitalized for one year. In the Borriello (1973) study, successful treatment durations ranged from 12 to 54 months, and treatment failure took between 8 and 34 months to determine. While we would certainly recommend any treatment procedures which hold therapeutic promise, our bias is toward behavioral approaches to therapy. These approaches generally concentrate on specific aspects of the individual's behavior which are in need of change, are usually of shorter duration, and generally provide greater specificity of procedural details. The behavioral approach is also consistent with the social learning approach to deviant behavior, which has been emphasized in this paper. Several examples of behavioral approaches are presented here.

Welsh (1971) used "stimulus satiation" to eliminate firesetting behavior in two 7-year-old boys. Each child was given the opportunity to strike as many matches as he wished, one by one, for 1 hour each day. The procedure was carried out in the therapist's playroom under the supervision of the therapist. In one case, the child was required to hold each match until the heat was felt on the fingertips; in the other case, each match was required to be held over the ashtray at arm's length until most of the match had burned, and the extended arm could not be supported on the table or by the other arm. When the child asked to stop, he was requested to light a few more matches and then allowed to engage in play activities. Firesetting was eliminated in both the playroom and the home in just a few sessions. Follow-ups over the next 6 months or so revealed no recurrence of firesetting behavior in the home. It should be pointed out that the results cannot be considered as due merely to satiation of firesetting; in both cases it appeared that firesetting was also made aversive for the child.

The aversiveness of fire-related activities was made explicit in a procedure reported by Denholtz (1972) designed to modify the firesetting behavior of a 17-year-old boy. The procedure involved the boy's operating a slide projector with his left hand. Some of the slides were pictures of the boy engaged in various fire-related activities. Other slides were positive slides of family members smiling benevolently at the boy, or pictures of the family automobile, because the boy was very fond of automobiles. Whenever a slide involving fire-related activities was presented, a powerful electric shock was presented to the right hand, and remained on as long as the slide remained on. When the slide projector was operated again, a positive scene was projected and the shock was terminated. The initial therapy session was

carried out in the therapist's office with other family members present. The remaining sessions were carried out at home by the family, and the interval between sessions was gradually increased. While firesetting ceased and the client's schoolwork and relationship with family appeared to improve, a drawback of the procedure was that the boy acquired a generalized aversion to fire to the point where he avoided even unlit matches. While this might be desirable in certain extreme circumstances, fire can be useful as well as harmful; procedures which develop aversions to fire may be disruptive to clients, and furthermore may be unnecessary.

Using only programmed positive consequences, Holland (1969) employed the parents as therapists in the treatment of firesetting in a 7-year-old boy. The boy was asked to bring the father any package of matches that he found around the house. The father rewarded the child with money for any package brought. To ensure that the desired behavior initially occurred and was rewarded, the father left one package with no matches, so that when the child found it there would be no reason to keep the package rather than return it to the father. When bringing matches to the father was firmly established, a second procedure was designed to strengthen non-striking behavior. The child was given the opportunity to strike 20 matches, but was rewarded with one penny for each match he did not strike. By the third such opportunity the child did not strike any matches. Firesetting was eliminated and follow-up over the next 8 months revealed no recurrence.

Using parents as therapists was an important part of Holland's procedure and was designed to increase the number of rewards the child received from the parents, thus improving the relationship with the parents. By working through family members in a triadic model of therapy (Tharpe & Wetzel, 1969) instead of directly with the patient (a diadic model), the therapist attempted to bring about improvements in the client's natural environment and eliminate those factors which might have been maintaining the maladaptive behavior. The effectiveness of this approach lies in the fact that it teaches people around the client skills in dealing with the client. If these skills are continually employed in the natural environment, positive changes are more likely to be maintained.

While some studies of selected populations have suggested that children who set fires have serious psychiatric problems requiring intensive intervention (Kaufman, Heims, & Reiser, 1962; Yarnell, 1940), recent studies have suggested that in many cases firesetting is more or less an outgrowth of a natural curiosity with fire. In these cases playing with matches may be the most important factor in firesetting, sometimes combined with transient or less serious disturbances in the youth or his home environment (Block, Block, & Folkman, 1976; Kafry, 1978; Siegelman, 1969; Siegelman & Folkman, 1971). At a recent Youthful Firesetter Workshop in Los Angeles,[3] a program was outlined for fire service personnel to provide counseling services to firesetters and their parents. A counseling program will have two major components. First of all, the counselor must screen the case to determine whether or not a referral for professional therapy is warranted. Where the youthful firesetter and/or his home environment are sufficiently disturbed, the counselor has neither the time nor the expertise to handle the case, and failure to make proper referrals could also have serious legal consequences. In less seriously disturbed cases, the counselor may elect to carry out the second component of the program. Here, the counselor will act as an educator in providing the client with information on the proper use of fire and on the possible consequences of firesetting. With the parents, the counselor will

often work out a program to reward the youth for proper use of fire and for not setting inappropriate fires.[4] The counselor is also instrumental in setting up restitution programs in which the youth makes amends for damage caused by his firesetting, and in helping the parents set up home fire safety programs for which the youth may be given primary responsibility. The opportunity to exhibit and be rewarded for responsible behavior can be helpful where the client seems to be lacking in self-confidence and may perceive himself as not being accepted by family and friends. Kafry (1978) also stresses the importance of dealing with children's actual behavior with fire, and not just their cognitive knowledge of fire safety.

If the counseling program is to be successful, cooperation of the parents or other responsible individuals is usually essential. The optimal program will also depend on the age of the client and individual circumstances surrounding each case. Training and experience are important in the counselor's ability to deal with these individual aspects. Counselors should participate in workshops and training seminars, and should regularly share information with one another. It is also desirable that professional consultation be readily available. Although still in its infancy, the counseling model presented here shows a great deal of promise in dealing directly with less serious cases of youthful firesetting, and in seeking help in treatment of the more serious cases.

The findings of Kafry (1978) and Block, Block, and Folkman (1976) suggest that the triadic model may be important as a fire prevention model as well. Kafry has pointed out that prohibiting experience with fire is not likely to be the surest method for preventing fires. Rather, children who express an interest in fire should be "provided with controlled experimentation and direction about the safe use of fire within established constraints and with information about appropriate reactions in times of hazard" (Kafry, 1978, p. 81). This "use matches safely" approach has recently been applied by the Hayward Fire Department (Inspector Ray Walters, personal communication; see also Kafry, 1978). The teaching of the children was done by parents who were trained by fire specialists. Following training, none of the 75 children who participated in the program were reported to have set fires. Kafry (1978) cautions, however, that such a program should not yet become common educational practice because of a "lack of cause and effect data on the effect of fire training on fire behaviors and because of the limitations that it may involve." It is possible that in certain circumstances children may interpret permission to experiment with fire under supervision as blanket permission to use matches in other circumstances as well. This is an area for future research.

Doolittle and Welsh (1974) reported on a triadic model which was employed by the Louisiana Forestry Commission in an attempt to reduce wildfires in one ward where fires occurred at a high rate. Officials believed that fires started by youngsters were the most common of all. A respected member of the community was chosen to contact and meet face to face with each family of the ward. The contact engaged in small talk with the families as well as talk of forest fires and forest management, and he gave coloring books or pencils to the children. He also discussed services available to landowners through the commission. One service, a controlled burning service, proved subsequently to be very popular among the residents of the ward. The authors report that over the 5 years of the program, wildfires decreased by 55%, and they attributed this decrease to the cooperation which the contact elicited from families in forest fire prevention, as well as the controlled burning service

which was offered by the commission. The choice of a well-known and respected member of the community as the contact seemed especially important in eliciting this cooperation.

We have emphasized the importance of a triadic model of therapy in promoting behavior change through improvements in the client's natural environment. However, we believe that these changes in the natural environment are an essential component of any therapeutic approach if therapeutic gains are to be maintained. This was certainly the view of Awad and Harrison (1976) in their psychoanalytic treatment of a firesetter. Other therapists have sought to improve social relationships by working directly with the entire family of the firesetter (Eisler, 1972; Menuchin, 1974).

With adult firesetters, however, the triadic model may be more difficult to employ, since it appears that for many adult firesetters the constellation of surrounding people may be constantly changing or difficult to access. In many cases, the offender may be in a hospital or prison, whereas therapy is geared toward the individual's behavior following release. In this case, the direct approach of the therapist may be more appropriate. The goal here is to establish skills which the client can eventually use to modify his own social environment. Assertion training (cf. Cotter & Guerra, 1976) to teach skills in social competence, and job skills training, where appropriate, may help the individual to obtain rewards in a more appropriate manner. There are many variants of the assertion training approach, all of which stress the learning, rehearsal, and use of specific skills in dealing with other people. As the client uses these skills successfully, he becomes more self-confident and social skills are maintained by the success they produce. Another approach, known as "cognitive restructuring" (Goldfried & Davison, 1977), emphasizes the challenging of irrational beliefs held by the client, and the changing of self-defeating behavior which results from these irrational beliefs. Both of these approaches emphasize the development and practice of specific skills in dealing with the environment, as well as the changing of attitudes, cognitions, and self-confidence. If, as we have suggested, social ineffectiveness is at least one component of firesetting behavior, then these approaches seem reasonable. Mathie and Schmidt (1977) recently reported the successful employment of a similar approach to the treatment of two incarcerated male arsonists, although precise details of therapeutic procedures were not given. It should also be noted that there is no a priori reason why these methods could not be employed along with other approaches which the therapist may deem important.

CONCLUDING REMARKS

In this paper, we have considered the myriad of potential factors involved in firesetting, as they have been presented in a rather diverse literature. Much of what is understood about firesetting from any given study has depended, not surprisingly, upon the particular viewpoint of the researcher involved, but the collection of literature presents a picture of the "typical" firesetter. This picture turns out to be one of an individual with several maladaptive behavior patterns, of which firesetting is one. Among adults, we have identified social ineffectiveness as a common factor in the general tendency of firesetters to have drinking problems, marital, occupational and sexual problems, and to exhibit a variety of other criminal and antisocial behaviors. Levin (1976) has suggested that there are no clear-cut differences between criminals "who set malicious

fires and those who do not; the similarities are more striking than the differences" (p. 41). One difference, if it holds up in future studies, is that arsonists appear to commit fewer crimes against persons and more crimes against property than do other types of criminals. Youthful firesetters have also typically shown a number of problems associated with firesetting including stealing, hyperactivity, truancy, and aggression.

The "typical" firesetter, however, does not likely represent any particular class or type. We have found classification systems based on one overriding characteristic, such as the firesetting motive, to be lacking. Potentially important differences between firesetters may be overlooked, while the overriding characteristics upon which classifications are made may be less important than was first thought. Perhaps this is the source of Lewis and Yarnell's (1951) confusion in trying to study the "pure" pyromaniac. We have speculated that it might be fruitful to examine clusters of factors from which different types of firesetters might be determined. Accordingly, we have organized findings of the various studies reviewed into four categories: antecedent environmental conditions, organismic variables, firesetting behavior, and consequences of firesetting. Different types of firesetters may differ in a number of ways both within and between these categories. These categories are also organized along the principles of behavioral assessment, and permit an understanding of firesetting behavior in terms of social learning theory, which we have emphasized in this paper.

Of course, in the final analysis, an adequate classification system may look somewhat different than we have suggested. The ideas presented here are admittedly speculative, and we offer only a general approach to a solution of the problem of classification, not the solution itself. As was pointed out earlier, the problems involved in research on firesetting, especially with adults, are formidable. Not only are we limited to studying those who are apprehended, but those firesetters who are studied are likely to be affected by the environments in which they are confined, usually a prison or psychiatric facility. Their behavior in that situation may have little to do with their behavior at the time they set fires. The reconstruction of events is likely to be colored by the months, or even years, which intervene between the adult firesetter's act and the researcher's study of that act.

The recent studies of firesetting in children indicate that studies of this group hold considerably more promise in this respect. Not only is there an opportunity to gather data from relatively recent events, but children can be studied in their natural habitat. Moreover, recent findings such as those of Kafry (1978) and Block, Block, and Folkman (1976) have indicated that perhaps firesetting should be studied under the more general heading of children's experience with fire and the ways in which these experiences contribute to fire causes. Kafry suggested that firesetters may fit on a continuum of children who set repeated fires, set single fires, play with matches, and those who do not engage in unsupervised fire play. She also suggested that children who play with matches are risk-takers: For example, children in the fire-play group also tended to have more accidents than those who did not play with matches.

A similar approach might be taken in the study of adult firesetting also, but nothing will be found in the literature relating firesetting to other human causes of fire. The legal system and tradition are clearly entrenched in the view that arson is a voluntary, malicious act, which is clearly differentiable from other causes of fire. Without arguing for or

against this view, we would merely point out that to the psychologist, such boundaries of behavior may be highly arbitrary. For example, Halpin (1978), in his study of fire deaths in Maryland, found that nearly half of all fire deaths were people who were legally intoxicated, a figure comparable to the proportion of arsonists who are intoxicated. Many of these fire deaths can be traced to acts of commission or omission which might not have occurred if the persons had not been intoxicated. In many cases, we might find similarities in the conditions contributing to these fires and the conditions which contribute to arson and to other types of human-caused fires. Certainly the results in any case are potentially as devastating, and a greater understanding of all contributions of human behavior in causing fires should ultimately aid in fire prevention.

Reference Notes

[1] In 1978, CBS produced a television documentary entitled "CBS Reports: The Fire Next Door" which documented the arson problem in South Bronx. An ABC production entitled "Arson: Fire for Hire!" concentrated on the arson problem in Boston.

[2] Both of the television documentaries (see Note 1) stressed the importance of the involvement of local citizens in solving the arson problem.

[3] The Youthful Firesetter Workshop, held in Los Angeles on April 21-22, 1978, was sponsored by the National Fire Prevention Control Administration and the Los Angeles County Fire Department Protective Services Panel. A multidisciplinary approach to intervention in cases of youthful firesetting was emphasized, and one goal of the sponsors was the production of a manual for intervention in these cases. We are indebted to the participants for many of the ideas presented in the following two paragraphs. Further details on the Youthful Firesetter Workshop may be obtained from Captain Joe Day, Los Angeles County Fire Department, P.O. Box 3009, Los Angeles, CA 90051.

[4] John Reid (personal communication) of the Oregon Social Learning Center also reported the successful treatment in private practice of some cases of firesetting, in which one component of the treatment approach involved the teaching of the children to light fires in appropriate circumstances. In fact, the opportunity to light fires in appropriate circumstances was used as a reward for not setting inappropriate fires.

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16. ABSTRACT (*A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.*)

Despite a rather large and diverse literature on firesetting, relatively little is understood about its determinants. This situation exists partly because of the enormous difficulties in carrying out systematic, well-controlled research studies on firesetting. Legal difficulties in accessing samples of arsonists, the manner of legal disposition of arson cases, and the fact that relatively few arsonists are apprehended makes it likely that research samples will be narrow and biased; it is not surprising that conclusions have often been contradictory and comparisons between groups have been extremely difficult. A further problem is that previous attempts at classification of firesetters have usually been based arbitrarily upon one aspect of the act, such as the firesetting motive, while other, potentially more important, distinguishing features may have been overlooked. After reviewing previous attempts at classifying firesetters, the present study organizes current knowledge about the characteristics of firesetters into four major categories: antecedent environmental conditions, organismic variables, actual firesetting behavior, and the consequences of firesetting. Understanding a firesetter's behavior requires an assessment of each of these categories, and types of firesetters may eventually be defined by clusters or patterns of characteristics rather than by a single, overriding feature. This approach is also useful in that it has theoretical implications as well as implications for prevention and treatment strategies.

17. KEY WORDS (*six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons*)

Abnormal psychology; arson; arsonists; firesetters; human behavior; literature reviews; pyromaniacs.

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